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AND

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DESIGNED FOR

INSTRUCTION AND ENTERTAINMENT,

AND ADAPTED TO

SCHOOLS, LYCEUMS AND FAMILIES.

CONDUCTED BY

JEROME V. C. SMITH, M. D.

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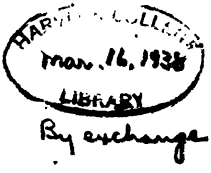

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

JANUARY 1, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

ASTRONOMY.

THE MOON.

After the sun, the moon is the most prominent and interesting object visible in the heavens. The theory of the moon's motions, as well as its place in the heavens at particular times, is of great importance in navigation; for by means of these, seamen ascertain the longitude of their vessels, and thus find how far east or west they are of their port of destination. The great improvements which have been made in Nautical Astronomy in modern times, have been mainly produced by the assiduous exertions of learned men to discover the true theory of the moon's motions; added to this, if we consider the vast influence which the old notions respecting the heavenly bodies, particularly that of the moon, have had upon the happiness of mankind, we cannot but acknowledge the importance of correct notions in relation to this subject among the great mass of the people. If to all this, we add the vast influence exercised by old prejudices and superstitions in relation to the influence of the moon on the local affairs of our planet and its inhabitants, even at the present time, we cannot but think some good may be done by devoting a few tracts to an explanation of some of the most obvious and important *facts* in relation to this subject. We propose to explain in a brief and practical manner, the cause of some of the most obvious appearances of the moon, together with the general laws which govern her motions. We shall be

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careful that our facts, when assumed, are drawn from authentic sources, and that our reasoning is such as may be understood and followed by common people.

Appearance and Constitution of the Moon.

When the moon is viewed with the naked eye, several dark spots are observed, which are occasioned by the moon's surface being broken into irregular portions. When we look at the surface of the moon with a good telescope, we find its surface wonderfully broken and diversified. Besides the dark spots which are visible to the naked eye, extensive valleys and long ridges of mountains are readily distinguished, projecting their shadows on the plains below. Single mountains are here and there seen, which rise to a considerable height. We may know that we truly behold mountains and valleys in the moon, by the simple consideration, that we behold and may trace the outlines of the shadows cast by the hills and mountains; and these are found to be in exact proportion to the lengths which they should have, knowing the inclination with which the sun's rays strike that part of the moon's surface. From the most accurate measurements of the heights of the lunar mountains, none of them are found to exceed two miles. There are also observed upon the moon's surface deep and accurately defined cavities or valleys. The mountains and hollows are all of one similar shape, being nearly all circular; the hollows having flat bottoms, and in most cases a small steep conical hill or mountain is seen directly in the middle of these valleys; thus presenting an exact resemblance of volcanoes, such as are found upon our planet; in point of fact, Dr. Herschel in 1787, saw three volcanoes in different parts of the new moon, two of them in an active state of eruption, sending forth flames. The next night after he first saw them, he observed them again still in flames.

When the moon is full, or in opposition, the elevations and depressions on her surface nearly disappear, because then the sun shines directly upon her surface, and, of

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course, cannot cast any shadows. During the increase of the moon from *new* to *full* we always see the bright or illuminated part nearest to the sun, and the remarkable spots always preserve the same position; that is, if any particular spot is seen near the east or west side or limb of the moon on any particular day, the same is always seen there. From these observations we conclude, that the moon always shows to us the same side or face, and that she has no light of her own, but shines with a light borrowed from the sun.

Some astronomers have supposed the dark spots seen upon the moon's surface to be water, but later observers deny the existence upon her surface of anything like deep water, although there are large portions of her surface which are perfectly level, but they are supposed to be alluvial tracts of land.

The moon is supposed not to have any clouds, or even any indications of an atmosphere, because nothing of the kind can be seen, as it could not fail to be, if there were any. Philosophers conclude from this, that its climate must be very singular, consisting of only two variations; one very hot, and the other very cold. As the lunar year consists of only what we call a lunar month, or 29 days, they must have a fortnight of intense heat, greater than is experienced on any portion of our planet, and a fortnight of the keenest frost, exceeding even our Greenland winter. This of course must produce absolute aridity under the sun, and a constant accumulation of ice in the opposite part of the moon. It is possible, however, that there may be a narrow region between these two extremes, where there is running water. It is possible also, as evaporation produces ice or cold, and condensation heat, that some degree of equilibrium in the temperature may be kept up, and thus, in some degree, modify the otherwise severe effects of their climates.

With the most powerful telescopes no indications of inhabitants, as would be shown by edifices, or changes on the surface of the soil, can be distinguished; in fact, telescopes must be greatly improved, before we can even hope for any such discoveries, for a line only one second

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in length at the moon, as seen from the earth, would be in fact at the moon about one mile in length—or to make it more palpable, a line at the moon one mile in length will appear to us to be only about the 1,300,000th part of a mile, and even the whole diameter of the moon, when nearest to us, as seen from the earth, is only 33 minutes, while its actual diameter is about 2160 miles.

The volume or bulk of the moon is about one-fortieth of that of the earth, but as there is a difference between bulk and density, the density of the moon is only about one sixty-ninth of that of the earth; therefore bodies upon her surface must have but a feeble gravitation; one pound at the earth, if carried to the moon, would weigh only one quarter of a pound, and muscular force, as existing upon our planet, would there go much further in overcoming weight, than upon the earth.

In a former tract on Gravity, the general laws of which were there explained, it was stated that the gravity of bodies above the surface of the earth, decreases as the square of the distance from the earth's centre increases; therefore, there would be a certain point between the earth and moon where a ball, if placed there, would not fall towards either body—but if moved beyond this point, the ball would fall towards that body towards which the movement was made, and calculation shows that this point would be about 632·70 miles from the earth. This fact, in conjunction with the existence of burning mountains in the moon, has led some philosophers to conjecture that the stones called *aerolites*, which at times fall to the earth, came from the moon, and were projected by the volcanoes; and this conclusion is not against all reason, for computation shows that if these stones have a velocity of about 8200 feet per second, it would cause them to pass from the moon to the earth.

We have already stated, above, that the moon has no clouds, and that her atmosphere must be extremely attenuated, if she has any at all—it must be more rare than we can produce with our best air-pumps. The light of the moon is only one 300,000th part of that of the sun. Thus much have we collected relating to the physical part of

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the subject of our inquiries, and upon this head we shall add but a few words more relating to the appearance of our planet to the inhabitants of the moon, if there are any. To them the earth must appear of great magnitude, nearly two degrees, or about four times larger than the moon appears to us; and to them our earth will exhibit the same phases as the moon does to us, but *immovably fixed in their sky*, while the stars will appear to pass slowly behind and beside it. Our earth, no doubt, will appear to them as broken into irregular portions, and surrounded by belts corresponding to our trade winds. It is doubted whether the outlines of our continents and seas can ever be distinctly discerned from the moon.

Motion of the Moon.

That motion of the moon which is most familiar to man, is her revolution about the earth once in about a month. The moon moves about the earth in a curved line. The time occupied in moving from any given star to the same again is 27 days, 7 hours, 43 minutes, and 11 seconds, and this is called a *sidereal revolution;* a comparison of this period of time with what it was in ancient times, has proved that the moon moves faster now than she did formerly. The time which the moon takes to perform a complete revolution from any particular point of her orbit to the same again, is about the same as for a sidereal revolution. The time from one new moon to another is 29 days, 12 hours, 44 minutes; this is called her synodical revolution. The mean distance of the moon from the earth is about 237,000 miles; we say mean distance, because sometimes she is nearer than at other times. The revolution of the moon about the earth, and its comparative position with respect to the sun and earth, cause what are called its phases. When the moon is in conjunction (*or new moon*) she is invisible, having her dark side turned entirely towards us. The different phases of the moon may be easily made visible, and well illustrated by a simple contrivance, as follows. Place a round body, as an apple or ball, upon a support, as the top of an empty

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candlestick, and place this with a lighted candle upon a table, so that the round body may be a little higher than the light; then have a second ball attached to a string, or piece of wood, or wire. Now move the second ball around the first, but not parallel to the table, but a little obliquely; and when this movable ball comes between the light and the fixed ball, it will be seen that no light will be reflected to the fixed one. In the same manner it may be shown, that when the fixed ball is between the light and movable ball, the whole surface which is towards the fixed ball will be enlightened. Now the light represents the sun, the fixed ball the earth, and the movable ball the moon; so that when the moon is in *opposition* (or full) she will have her enlightened disk towards the earth. The same illustration will also show, that when the moon is midway between full and new, she will only show a part of her disk; she is then said to be in her *quadratures*. Thus then, during an entire revolution of the moon about the earth, she presents to us all the possible differences of face, between a disk entirely enlightened and one completely obscured.

By the same illustration, we may see what the phases of the earth would be, if viewed from the moon. When the moon is full, the earth will be obscured, if viewed from the moon; and when the moon is dark or obscured, the earth would appear full. When we see the moon just after conjunction, as two days after change, an observer at the moon would see the earth almost full. The light of the moon is derived from the sun, which is reflected from her to the earth, and a small part of it is reflected by the earth back again to the moon, and thus causes the whole contour of the moon to be dimly seen, even when but a small part of her disk is really enlightened.

It is supposed by many learned men (and with much plausibility) that the regular succession of the changes of the moon first suggested the division of time called a month; in point of fact, the Greek word *menos*, from which our word month is said to be derived, also means the moon. Some others have suggested that the quarterly phases of the moon, happening as they do every seventh day, first gave rise to the almost universal weekly division of time. It

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will be remembered that the Deity himself gave the weekly division to his chosen people, the Jews; but other people who were ignorant of the revelation to Moses, had the same period of time.

During the journey of the moon round the earth, she is sometimes nearer to the sun than at other times; and as the sun is the centre of attraction, the moon must be more attracted towards the sun when she is near, than when further off. All these influences of the sun produce different effects, according to the relative situations of these bodies. When the moon is in opposition, or full, she is further from the sun, of course not so much attracted as the earth; therefore she moves in a straighter line and not so fast as when she is in opposition or nearer to the sun. The moon being so near to the earth, the inequalities in her motion are very great when compared with the other heavenly bodies, and thus renders the calculation of her motion and place very difficult. It is impossible to explain the cause or effect of these irregularities, without the assistance of the higher mathematics. Sufficient, we trust, has been said of her motion to give a popular view of this part of our subject.

Tides.

The subject of the tides we have before glanced at in Vol. II. No. 7, of the Tracts, but shall now attempt an explanation of them in a more detailed manner.

The most remarkable apparent effect produced upon the earth by the motion of the moon, is that which causes a periodical flux and reflux of the waters of the ocean, called *tides*.

The moon revolves in its orbit about the earth, and in consequence of the universal law of gravitation, attracts or draws the earth and all its parts towards herself; but as the solid parts of the earth have cohesion, one part cannot be drawn towards the moon, without drawing all the other parts; but it is different with the liquid parts—they having but little cohesion, and their parts moving freely among themselves, one part may be attracted and drawn away from those parts which are more distant from the

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attracting body. The moon acts upon the solid and liquid parts at the same time; and in consequence of the mobility of the liquid parts, they are soonest and easiest drawn towards the moon, away from the solid parts of the earth; thus causing the waters of the ocean to be heaped up under the moon. This explanation accounts for one tide, only, during one revolution of the moon; and it is high water at two places upon the earth at the same time—one upon that part of the earth which is directly under the moon, and another upon the opposite side of the earth.

This second tide is explained in the following manner; the solid parts of the earth being nearer to the moon than the liquid parts, which are on the opposite side of the earth, are more attracted than the liquid parts; of course the solid parts are drawn *away*, and the waters will there rise. This explains the two high tides, and the low tides are a necessary consequence of the elevation; the two middle points between the two high tides, will have low tides at the time of high tide; so that there are two high tides and two low tides in about 24½ hours, which is the moon's daily circuit round the earth.

As the earth turns on its axis once in about a lunar day, (and while she is so turning the moon is proceeding on her course about the earth, so that the earth must turn a little more than completely round before any place upon its surface will be in the same situation with respect to the moon that it was at the time of beginning the revolution,) this will cause any place to come to the meridian later, and thus cause high or low water at any particular place to happen about 50 minutes later on each succeeding day.

The orbit or path in which the moon moves about the earth, is but little different from the path in which the sun appears to move about the earth, (*Ecliptic*) and as this is in no place more than about 23½ degrees from the equator, it is evident that the waters near the equator, being nearer to the moon than the poles, of course will be more attracted, and the tides at the equator will be higher than at the poles, where tides must disappear. The tides at the mouth of the river Amazon are very high, and extend more than five hundred miles up the river.

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As the sun attracts the waters of the ocean, as well as the moon, when they both come into such a position as to act together, the tides must be higher than when but one of these bodies acts; but when the moon is at the full or change, they both act together, because then the sun, earth and moon are nearly in the same right line, and of course the tides will be higher at new and full moon—and they are then called *spring* tides. When the moon is in its quadratures, (*quarters*) the sun and moon act upon different parts of the earth at the same time, and each strives to raise a tide of its own, and therefore counteract each other's effect; this causes the waters not to rise so high as they otherwise would, and thus causes low tides, when the moon is in the quadratures, and these are called *neap tides.*

Most of our readers probably know, that all *spring tides* are not equally high; the nearer the sun and moon are to each other, the greater will be their combined action upon the waters of the ocean. Now the sun and moon are nearest together when the sun is in the equator, that is, at the time of the *equinoxes* (*September and March.*) But the sun is nearer to the earth at the fall equinox than at the spring equinox; therefore the action of the sun and moon upon the earth's waters will be greater at the fall equinox than in the spring; this causes the tides at or near the autumnal equinox (September 22d) to be higher than at any other time of the year.

The tides have a particular reference to the position of the moon, as well as to its phases; for it is always high water (*in the ocean,*) when the moon is on a particular point of the compass, (*nearly S. W.*) In theory it would seem to be high water at any particular place when the moon was south; but owing to the progressive effect of the moon's attraction, it is high water at some particular places about three hours before the moon comes to the meridian, while at others the high water comes after she has passed the meridian.

From accurate observations and registers of the phenomena of the tides, it is ascertained, that the highest tide during any one lunation, happens about one day and a half after the *full* or *change.* If the time of high water

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happen at or near the same time of new or full moon, the third high tide after is found to be highest during the moon; this, correctly speaking, is the spring tide, there being but one during the moon. From the time of the highest tide during the moon, they gradually decrease until the third tide after the moon quarters, which is the lowest of all, and is properly the *neap tide.* After this the tides again increase until the next spring tide and so on continually, the higher the flood tide rises, the lower the ebb sinks on that day. Thus we may observe, as in other cases, the effect of the sun and moon is not greatest, or least, when the immediate influence of the cause is greatest or least, as we see the greatest heat of the sun is not on the solsticial day, (*when the sun is at its highest point*) but some time after.

What has been said above, of the theory of the tides, must be understood upon the supposition, that the globe of the earth is entirely covered with water to a considerable depth; continents, which stop the course of the tides, straits between them, islands, and shallowness of the sea in some places, are all impediments to the course of the water, and thus cause many exceptions, which can only be explained from particular observations at different places. The latitude of the place appears to have considerable effect upon the tides; some phenomena happen in high latitudes which are not seen near the equator. If observations upon the tide are made at a place which has the same latitude as the moon has declination, (*distance from the heavenly equator*) but a single tide will be seen, there being 12 hours of flood and 12 hours of ebb.

We have said that local circumstances greatly modify all the phenomena of the tides: the following are illustrations of this remark. The position of shores, the width of channels through which the waters pass, the extent of seas, direction of prevailing winds with respect to the shores, &c. all have considerable influence upon the quantity of the tides. Strong winds, in a particular direction for a long time, produce currents in the ocean, which of course will affect the tides; this will cause places subject to the same influence of the sun and moon to have very different tides. Continents stop the tides in their

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course from east to west; therefore the tides on an eastern coast are higher than on a western: the waters of the Mexican Gulf, on the eastern coast of America, are several feet higher than the waters of the Pacific ocean, on the western side of the Isthmus of Darien. The waters of the Red Sea are a number of feet higher than those of the Mediterranean. Rivers and bays opening to the east, have higher tides than those with a western aspect; in such places the tides are further influenced by the adjacent shores. Where bays have a narrow entrance or are narrow in their course, tides often rise to a great height. In the Bay of Fundy the tides often rise sixty feet, and with great rapidity; the tides also are very high in the strait of Sunda, and in the Red Sea; all of these have an eastern aspect. But in the Baltic sea, and in the Mediterranean, there is but very little tide, as their entrance opens to the west. This fact probably explains the reason why the ancients were ignorant of any such phenomena as the tides. Narrow channels oppose so much resistance to the water, that tides in such places often rise with astonishing rapidity; in some of the rivers on the eastern coast of England, the flood tides enter them with a head of several feet; that is, the waters of the coming tide are several feet above the waters of the river. In some situations, where there are great obstructions, and a crooked course for the tide to follow, there are several tides at the same time, but a short distance from each other; as, it is high water at London and at the mouth of the Thames at the same time, while between, it is low tide. In the river Amazon in South America, there are no less than seven high tides at the same time, while there is a low tide between every two. It would be endless to specify all the circumstances applicable to particular cases, as the solutions are easy consequences from the general statement of the facts above given. We shall dwell but a moment longer on this part of our subject. Why do not lakes and large inland seas, as Lake Superior, the Caspian sea, &c. have tides? The reason is, lakes are so small, compared with the ocean, that where the moon is vertical, (*or south*) she attracts every part of a lake alike, so that no part of the water can be raised above another; and having no communication with the

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ocean, it cannot increase or diminish the quantity of water so as to make it rise or fall. The same reason will apply where large bodies of water are connected by narrow channels with the ocean; they are so large, and their inlets so narrow, that they cannot readily receive water enough to raise their surfaces.

Eclipses of the Moon.

All the planets of our system, and their satellites, are illuminated by the sun; it is his light which makes them visible to the inhabitants of the earth; it is evident then, that all of these cast shadows towards that point of the heavens which is opposite to the sun.

The light of the sun makes the surface of the moon visible to us upon the earth, and if the earth or any other opaque body should come between the sun and moon, it would cast a shadow towards the moon, which of course, if long enough, would intercept a part or the whole of the sun upon the moon, and thus cause an eclipse of the moon. When the moon is eclipsed to us, a spectator at the moon would of course see an eclipse of the sun, which would be total to those parts on which the shadow of the earth fell.

An eclipse of the moon happens only at the time of full moon, because then only the earth is directly between the sun and moon. There is not an eclipse of the moon at every full, as there would be if the sun, earth, and moon were then in the same right line. To explain the cause of eclipses of the moon, we invite those who are not ready in *conceiving* the subject, to make use of the following simple contrivance to render *palpable* this part of our subject. Take two pieces of common wire of unequal lengths, say of four and two feet; make these into circles, and let each one have two supports—the supports for the larger circle of equal lengths, say about one foot, the supports for the smaller circle one $9\frac{3}{4}$ inches, and the other $14\frac{3}{4}$ inches, or in this proportion. Let the wire circles be placed upon these supports so as to divide each circle into two equal parts, and place them upon a table, the small circle within the larger; and then place one of the balls, mentioned in a former illustration, in the middle

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of the lesser circle, and place a lighted candle upon the table, at the height of about one foot. In this position of the apparatus, the large circle may represent the *apparent* annual path of the sun about the earth, and the smaller circle may represent the path of the moon about the earth, while the candle is the sun. Now let a piece of paper be placed upon the small circle, directly opposite to the light; this will represent the moon at opposition or full. The two wires will cross each other in two points; these points are called the *nodes of the moon*, and because the orbit of the moon is not stationary these points are variable. It is evident from the situation of the different bodies, that the moon may be full in the *nodes;* turn then the small circle until the points of intersection with the larger come into a straight line from the light to the middle ball; in this position it is plain that the moon would be full in the nodes, and the earth would cast a shadow which would strike the moon; therefore there would be an eclipse of the moon. The same would happen, if the moon should full within a certain distance of the nodes. Astronomers say, that if the moon fulls within 7 degrees and 47 minutes of the nodes, there must be an eclipse of the moon; and if this distance be more than 13 degrees and 21 minutes there cannot be an eclipse.

The following are some of the principal circumstances of a lunar eclipse.

All eclipses of the moon are visible to all places, when the moon is above the horizon, and are everywhere of the same magnitude and duration; because, as before stated, the eclipse is owing to the loss of the moon's borrowed light. 2. In all eclipses of the moon, the side of the moon next to the eastern part of the heavens is that which is first covered by the earth's shadow; because the earth and moon are both moving towards the same part of the heavens, from west to east; and as the moon moves faster than the earth, she comes from the west and overtakes the earth's shadow and passes through it, of course with her eastern limb foremost, leaving the shadow behind. 3. Total eclipses of the moon take place, either when the full moon happens in the *node*, or very near it; when the eclipse is in the node, its duration is full two hours, while

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in any other situation of the moon, the total obscuration is but short. 4. If the earth had no atmosphere, the moon, when totally eclipsed, would be perfectly invisible; but owing to our atmosphere, she never is perfectly so, owing to the refractive power of the air, which refracts a part of the sun's light back to the moon, and thus causes her to appear at such times imperfectly visible.

Eclipses are of considerable use in Astronomy and Navigation. Eclipses of the moon prove that the earth is sensibly round, because the shadow of the earth upon the moon is round, and none but a spherical or round solid can cast such a shadow. Eclipses of the moon also prove, that the earth is smaller than the sun, and larger than the moon. Eclipses of the moon, which happen under similar circumstances, at considerable intervals of time, are also used to ascertain the period of the moon's motions. Eclipses of the moon are of frequent use to determine the longitude of places upon the earth; by marking the time of beginning or ending, at any one place, and comparing it with the time as observed at another place, the difference in time would make the difference in longitude, by allowing 15 degrees for each hour of time.

The Harvest Moon.

The full moon, which happens at or near to the autumnal equinox, is called the *harvest moon*, and was long known and improved by the husbandman, even before Astronomers were able to explain the reason of it. This is called the *harvest moon*, because during the time she is full at this period, and for a few days before and after, in all about a week, there is but a small difference in the time of her rising on two consecutive nights; the difference in the time of her rising will not be above one hour and a half in seven days, while at other times it would be three hours and a half. Thus the moon at this time of the year affords an immediate supply of light after sun-set, which in former times was considered beneficial in gathering in the fruits of the earth at harvest time—hence the name harvest moon. The cause of this phenomenon is found, in

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considering that all parts of the ecliptic do not rise above the horizon the same space in the same time, there being certain portions of it which rise through small spaces at certain times, and these times are when the harvest moons happen. The moon passes through these short spaces every lunation, but as she is not always full when there we do not notice it.

The movement of the nodes of the moon, causes the harvest moons to revolve, and this causes some harvest moons to be more beneficial to the husbandman than others. For the convenience of our readers, we here subjoin a table of the harvest moons for several years to come.

HARVEST MOONS.

Most.	Least.	Most.
1835	1833	1853
1836	1834	1854
1837	1844	
1838	1845	
1839	1846	
1840	1847	
1841	1848	
1842	1849	

When the moon is just rising or setting, she often appears much larger than when south, and yet Astronomers demonstrate that she is much nearer to a spectator when south than when just rising or setting, by the half of the diameter of the earth. This apparent increase in size is an optical illusion, caused by the light of the moon, and by the concavity of the heavens appearing different from what it actually is.

Influence of the Moon.

Much has been said and written in former times, of the influence of the moon and planets upon the earth, and all thereon. It is among the popular superstitions of the present day, that the moon has some influence upon the

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vegetation of our planet; as that, particular times of the moon promote the vegetation of some plants, and the same retards the vegetation of others. The moon also is believed to have a material influence upon the human body, particularly when in a diseased state, as in fevers, madness, &c. We propose to give the results of a distinguished philosopher upon this part of our subject, premising that all researches upon this point must be purely inductive, and founded upon a close observation of all the *facts*.

The most general opinion respecting the influence of the moon on the earth, is, that it affects the weather. The untutored Indian foretells the coming weather by an examination of the appearance, place, and relative situation of the moon. The philosopher, as well as the most unlearned, have many *signs* of the coming storm, all founded upon the appearance of the moon. The first question examined by M. Arago, the author whose views of this subject we intend to follow, is *whether the moon has any influence on the rain.* The facts upon which the inferences are founded, are derived from patient examination. From a series of observations made in Germany, during a period of twenty-eight years, it appears that the greatest number of rainy days happened between the *first quarter* and the *full moon.* In round numbers, the proportion of the rainy days in this interval, is to the number of rainy days between the last quarter and new moon, as 6 to 5. These results are confirmed by other sets of observations, and if faith is placed in the truth of the observations, we must believe that it rains more frequently on the day of the full, than on that of the new moon.

'From these results,' says, M. Arago, 'it is difficult to resist the conclusion that the moon exercises some influence on our atmosphere; and that in consequence of this influence, rain falls more frequently, at or near the full, than at any other epoch of the lunar month; and that the chances of rain are fewest between the last quarter and the new moon.' Another fact, to prove that the moon has an influence on our atmosphere, is derived from observations of the height of the mercury in the barometer at the different phases of the moon. From a series of observa-

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tions, extending over a period of forty-five years, it appears that the mercury of the barometer is higher at the quarters, than at the full or new moon. Two other sets of observations are adduced by M. Arago, both pointing to the same conclusions. The differences are so small, however, that but little importance can be attached to this method of proof.

The next question discussed by our author, is the nature of the lunar action, if such does exist. It is supposed that the moon can act only in one of the three following ways: by its attraction; by the light which it reflects; or by some obscure and undefinable emanations. The barometrical observations, show that the lunar actions causes a diminution of pressure; but it is readily seen that this effect should follow quite a different law from that indicated by the observations above, because the attraction of the moon is the same at new and full moon. The conclusion is, that the inequalities of pressure indicated by the observations must be referred to some other cause than that of attraction.

The next examination, is the popular opinion that a *change of the moon* produces a *change of weather*. The ratio of the number of *changes* of weather, to the number of *no changes*, at the different phases of the moon, were as follows:—New moon, 6 to 1; full moon, 5 to 1; first quarter, 2 to 1; second quarter, 2 to 1. That is, of seven new moons six were accompanied with a change of weather; and so on, for all the other numbers mentioned above. At the quarters, it will be seen that the changes were twice as often as *no changes*.

These results would be conclusive, if their accuracy could be depended upon; but, unluckily for the weather-wise, no certain reliance can be placed upon them, because in many instances two or three days before, and after the day of the phase, was the time of the greatest influence.

The popular opinion is, that a change of the moon will produce a change of weather. The contrary has been found to be the case by observation. From a large number of observations made in Germany, during a period of over

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fifty years, it was found that the new moon was the time at which the least number of changes happened.

Among the ancients it was a prevalent belief, that, *if on the third day of the new moon the horns were sharp and well defined, the sky would continue serene and clear during the whole month.* The same opinion is current at the present day, among a large class of people.

There may be some reason in this *sign;* not, however, because it depends upon the moon, but on the state of the atmosphere through which we see the moon; as may readily be seen through a good telescope. When the atmosphere is troubled and not settled, it will cause the horns to be enlarged. Another idea prevalent among some of our citizens, is, that when the crescent of the new moon is perpendicular, or nearly so, to the horizon, the month will be a wet one. This notion is said to have been received from the aborigines of our country, who had a saying, that *if a powder horn could not be hung upon the lower horn of the moon, it would be a wet month.* The position of the crescent with respect to the horizon, depends upon the relative situations of the sun, moon and earth; and, as all situations are periodical and in some degree regular, there should be regular periodical rains, which is not the case.

Many other sayings and signs of the same nature might be mentioned, which are more or less extensively believed. But they all had their origin in the ignorance and superstition of former times, and are now totally disregarded, excepting by the very ignorant and credulous.

The influence of the moon, in the opinion of many, is not confined to the changes of the weather. It is a matter of serious belief among many of our husbandmen, that the moon has a direct influence on the growth of vegetables. Some kind of seeds must be sown in the old of the moon, others in the new, in order to produce a good crop. It is manifest on a little reflection, that all such notions are not founded upon facts. Because the new or old moons do not always happen at the same time of the season every year, but during a course of nineteen years, they perform a complete revolution; and the growth of vegetables depends upon the season, the whole season,

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and not on seven days of it, which is the length of each phase of the moon.

Many people believe that the light of the moon has a material influence upon organic life; many believe that the light of the moon at certain seasons of the year, is very injurious to many kinds of plants; but modern science has shown that the effect which was supposed to be owing to the light of the moon, is in fact produced by the different capacities of bodies for radiating heat. The effect of freezing, thought by some to be produced by the light of the moon, is accounted for in the following manner. Any body exposed to the light of the moon, that is, to a clear sky, becomes, in consequence of the radiation of its heat, colder than the surrounding air. We cannot, therefore, judge of the degree of cold with which a plant is affected during the night, by the temperature of the surrounding air; for a plant, or tender shoot, may be frozen, although the air remains several degrees above the freezing point.

The light of the moon is supposed also, by many, to darken the human complexion. By direct experiment this has been found incorrect.

The influence of the moon on the human body, particularly in a diseased state, is a notion as old as the world itself; and we have met with some few who believe in the action of the moon on the human body in all conditions, particularly on the blood—believing that if a person should have a limb amputated when the moon was not in the right place, they would inevitably bleed to death. Happily, such superstitious ideas are not very common.

Hippocrates was so firm a believer in the influence of the stars and moon on the human body, that he advises no physician to be trusted who is ignorant of Astronomy.

Galen was a zealous believer in the same doctrine; and from him has arisen the notions about critical days in diseases—as the seventh, fourteenth and twenty-first days of fevers, &c. These are all manifestly supposed to be connected with the phases of the moon.

Many physicians of great repute in modern times, have held the same views, as Mead, Hoffman, Sauvage, &c.; but names should not be received for facts. The whole

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doctrine of the lunar action is founded upon anological reasoning. Particular states of the weather may have accompanied particular phases of the moon, for twenty successive moons, and then failed in one instance: this single failure destroys the universality of the law, just as effectually as a hundred failures. The same remarks apply to the other effects, said to be produced by the moon. In conclusion, we think it might be shown, that all the opinions now received respecting the influence of the moon, are the remains of the senseless jargon of the Astrologers. Science a long time since dissipated the whole fabric of *Necromancy*, *Astrology*, *Signs*, &c.; but so long as science is confined to the few, and its lights concealed under a bushel, so long must the many be trammelled by old and superstitious notions. Let the wise, then, unseal their books, divest their works of the foreign and technical dress in which they are clothed, and show them to *the people*, in a more modernized attire, and thus drive error and superstition out of our land, and out of the world.

[From the Transactions of the N. Y. Lit. and Phil. Society.]

ORNITHOLOGY.

The science of Ornithology is involved in considerable difficulty and confusion. The arrangement of animals, according to the principles of the Linnæan system, is an admirable contrivance to extricate the science of zoology from the darkness which surrounds it. The classes and orders of the great naturalist are arbitrary; the genera and species are natural; but when we consider that the general characters of birds are taken from the bill, tongue, nostrils, cere, caruncles, and other naked parts—and that the characters of the species are derived principally from the plumage and habitudes, we must be sensible that here is a wide field for a difference of opinion. Besides, the nomenclature adopted, in endeavoring to compress the descriptions of animals within the shortest compass, is frequently a mystery to most readers. Take, for instance, an account of a bird by Linnæus, Latham, or Pennant,

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and it will require considerable industry to penetrate the exact meaning of the author. The generic characters frequently run so closely into each other, that it is no easy task to make the appropriate arrangement. The plumage of birds varies according to seasons, to age, and to climate, and their manners assume a different appearance at different times, and in different countries. The sexes exhibit, almost invariably, a diversity. The male is frequently smaller than the female, and is generally arrayed in a more beautiful dress. Genera are confounded together; varieties are represented as distinct species; the male is placed in a different species from his mate, and the same bird, at different ages and seasons, is considered a different species. The names of birds vary in different places.

In the same district of country the same bird frequently goes by different appellations, and the scientific name is also not uniform; Linnæus, Brisson, and Buffon, oftentimes disagree. We may add to this, the absurd custom adopted in this country of naming our birds after those in Europe, to which they are supposed to have some likeness, although, in most respects, they are dissimilar.

There are three modes in which we may obtain a knowledge of birds. From personal observation of these animals in their natural state—from preserved subjects in cabinets of natural history, and from books. The first is undoubtedly preferable, so far as it goes; but it is necessarily limited by our range of travelling. The second supplies this defect, but it is liable to this great objection; the subjects are often not only imperfectly prepared in the first instance, but generally decay and dissolve. In Cayenne, which has furnished more subjects for the cabinets of European naturalists than any other country, the birds are steeped in spirits for a long time, and dried by the heat of an oven. This must undoubtedly, in many instances, sully the glossy beauty of their plumage, and give them an appearance different from their natural one. Books must be resorted to in order to complete and extend our knowledge; but to place our sole reliance on them would be as absurd as to attempt to attain a knowledge of mankind by the meditations of contemplative retirement.

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[Furnished for the Tracts and Lyceum.]

ANIMAL MECHANISM.

A WORK will soon be issued, called the 'ANATOMICAL CLASS BOOK,' designed expressly for the use of schools. It is freed as much as possible from technicalities, and therefore adapted to the comprehension of youth. It abounds with engravings, illustrative of the text. The plate on the opposite page is taken from page 82 of the book in question, which is introduced here in order to convey some general idea of the labor bestowed upon the volume.

The letters refer to the names of the muscles. They are beautifully and truly represented, as they exist on every man, woman and child. *a d b*, is a muscle, called trapezius—laying like a cape over the back of the neck and shoulder. There is one over each shoulder blade, united in the middle, over the bones of the back. By the contraction of the upper portion, marked *a*, the head is drawn back; by the contraction of the side portion, *a*, the shoulders are drawn together. By the side of the neck, *i* is the *sterno cleido mastoid muscle*, which brings the head forward, and by counteracting the action of the trapezius, at *a*, maintains the head in a vertical position. Over the shoulder joint, and reaching to the middle of the arm, is the *deltoid muscle*, marked *h*, which raises the limb to a horizontal line: *f* is the *latissimus dorsi*, which brings the hand and arm down forcibly, as in striking with a hammer. At *c* is the joint: *k e m* is the *infra spinatus*, which assists in rolling the arm, and also pulls away the covering of the joint, so that it may not be pinched between the ends of the bones, in motions of the shoulder.

Under *n n n n*, are slips which fasten the latissimus to the ribs; and *g* and *l*, is the point where the great muscles or moving power of the lower limbs meet the broad muscle of the arm, which has been described.

From time to time, we shall introduce both plates and extracts, which we trust will be interesting as well as valuable to our readers.

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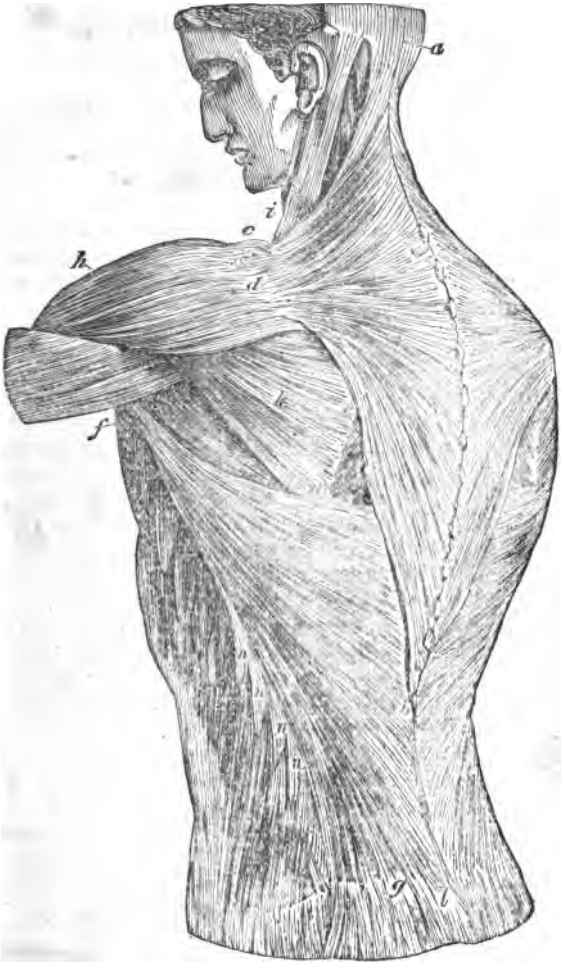

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[Furnished for the Tracts and Lyceum.]

VENOMOUS CHARACTER OF SPIDERS.

A FEW months since, a gentleman in this vicinity was an eye-witness to a mortal combat between a young rat and a small spider. When they were first discovered, the rat was evidently too weak to offer resistance to its lilliputian foe; but feeling, probably, after repeated trials, that discretion was the better part of valor, endeavored to get out of the reach of its violent antagonist. In this feeble effort, it reminded the astonished spectator of that renowned couplet in Hudibras—

> Who from battle runs away
> May live to fight another day.

However, not to sport with the sufferings of the maimed mischievous night-annoying quadruped, whose species have made many a sad havoc with the family stores, it is evident that the deadly poison of the spider was then diffusing itself through the body. The spider, in the mean time, apparently watched its dying movements, and when the rat crawled too fast, it would dart up to the body and give another bite. Suffice it to say, the rat died, and the fallen enemy, together with its belligerent conqueror, who was captured on the spot, were both secured in one bottle, and may now be seen in the cabinet in Tremont Street, in this city.

The poison of the spider is secreted in sacs, at the angles of the mouth; but in this climate, it is pretty satisfactorily proved, they never attack animals, unless in a case of desperate necessity, where the law of self-preservation obliges them to slay or be slain. In the case now in question, the rat probably pressed the spider against the wall, in passing; and the spider, to save its own life, darted in its fangs. When once excited, nothing seems to appease their wrath but the death of the object of their revenge. This will account for the repeated attacks on the rat.

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[Furnished for the Tracts and Lyceum.]

DRAWINGS.

To illustrate the lectures which are given before Lyceums, it is very important to present numerous diagrams, in order to give the assembly the clearest understanding of the subject upon which the lecturer is discoursing. Natural history, mineralogy, botany, geography, and astronomy, cannot be comprehended by youth, without something on which the eye can rest, while they listen to the speaker. The utility of drawings must be universally admitted; yet but little or no pains is taken to prepare them.

A common reason why drawings are not procured, arises from the difficulty—so it is said—of finding artists in the country, who are competent to the undertaking. This, by the way, is no excuse at all. The man who consents to lecture, can best make the pictures he stands in need of. The practice of a few days, does wonders for a person who would not have supposed it possible to have executed a decent looking plan, of any sort, with a pencil. India ink is the only pigment that is necessary. Paper, however coarse, is as good to represent ideas upon as glazed silk. Where large objects are to be portrayed, as the larger class of animals, common cotton cloth, put upon the stretch, and sized over with flour paste, is excellent. The cloth may be rolled up, and thus be kept for many years, always in a condition to be used.

THE TURKEY.

Thomas Pennant published, in the Transactions of the Royal Society, a paper to show that the turkey came from America, and was unknown before the discovery of that continent. Daines Barrington, who has taken the opposite side of the question, asserts that this fine bird boasts an eastern origin. According to a distich in Baker's Chronicle, turkeys were introduced into England from

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Spain. Latham, in his Synopsis of Birds, says, that turkeys were brought into England about 1524, and that they unquestionably came originally from America, and are found largest in the northern parts. Bartram, in his travels through the Carolinas and Floridas, represents 'our turkey as a very different species from the meleagris of Asia and Europe; they are nearly thrice their size and weight; they are taller, and have a much longer neck proportionately, and likewise longer legs, and stand more erect; they are also very different in color; they are all of a dark brown color, not having a black feather on them; but the male is exceedingly splendid, with changeable colors.' Michaux, in his Travels to the westward of the Alleghany Mountains, &c. says, 'To the east of the Mississippi, in a space of more than eight hundred leagues, there is only one species of wild turkey. Some weigh thirty-five or forty pounds. The variety of domestic turkeys to which the name of English turkeys is given in France, came originally from this species of wild turkey, and when they are not crossed with the common species, they retain the primitive color of their plumage as well as that of their legs, which is a deep red. If subsequent to 1525 our domestic turkeys were naturalized in Spain, and from thence were introduced into the rest of Europe, it is probable that they were originally from some of the more southern parts of America, where they doubtless exist a species different from that of the United States.'

Notwithstanding the authoritative decisions of the two last quoted writers, I think we may venture to dissent from them, and to say that the wild and tame turkeys are only varieties of the same species. It is well known that they breed together, and that their offspring are also productive. The only difficulty, then, is respecting their size and plumage; all animals are changed by domestication. Their color, in a wild state, is generally uniform and similar, but when tamed, it changes into a number of varieties. The mallard is the stock from whence our domestic duck proceeds, and the gray lag is the origin of the domestic goose. The color of these birds, in their reclaimed condition, is various; in their wild state it is uniform. The turkey, when domesticated, is exposed to

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the same mutations. As to comparative size, it may be observed, that the largest wild turkey does not exceed the largest tame turkey one half in weight; and this may also proceed from domestication. If the bison is the original stock of our tame cattle, has not the latter diminished in magnitude by the change? But this diversity may, perhaps, be satisfactorily accounted for in another way. The turkey was introduced into Europe from Spain, and Spain derived it from her tropical colonies. It is a bird which flourishes best in temperate climates; as it extended its migrations too far to the south, it diminished in size: although the identity of species could not be changed, yet a variety was produced of inferior magnitude. From the Spanish turkey, which was thus spread over Europe, we have obtained our domestic one. The wild turkey has been frequently tamed, and his offspring is of a larger size.

BIRDS.

The Rev. Dr. Miller, in his excellent work, entitled A Retrospect of the Eighteenth Century, states, that there are two thousand five hundred and thirty-six species of birds. Latham, in the first six volumes of his Synopsis of Birds, has described ninety-six genera, and two thousand and forty-six species. The additions made in his subsequent volumes have increased the number of species to three thousand.

The number of birds treated by Linnæus did not greatly exceed nine hundred.

There are in Great Britain three hundred and seven species of birds, comprehending all such as either visit that island at uncertain seasons, or are usually domesticated, as well as those which are known to be constant inhabitants, of which one hundred and fifty-four are land birds, and one hundred and fifty-three water birds.

I think it is not unreasonable to suppose that there are in the United States and its territories, one thousand species of birds.

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ORIGINAL MISCELLANY.

THE TRACTS AND LYCEUM.—Three volumes of the Scientific Tracts have been completed, since they were projected, and they have been gradually gaining favor with the reading community. For the library, these volumes, on account of their original essays, will always be valuable, because they contain the latest as well as the most accurate information which the writers were able to collect, on the subjects upon which they have treated.

Instead of being the labor of one individual, exertions have invariably been made to enlist the services of men of science, who were supposed to be well acquainted with the subjects on which they consented to write. In this way, we have been able to present our patrons with an immense amount of purely original matter, which otherwise would never have reached them in a form so cheap or so popular.

The publishers, ever desirous of meeting the wishes of their subscribers, have devised a new method of presenting them, in connection with the regular series of Tracts, a miscellaneous collection of all that is curious or worth knowing, in relation to the progress of the various institutions of the world, which have for their object the moral or physical cultivation of mankind. In short, without being restricted to any particular system, as it regards one half of the pages of each successive number, whatever relates to the great plan in view, increasing the amount of useful knowledge, will be embraced, and items, therefore, and contributions from all well-wishers of our cause, are earnestly desired.

A union, it will be perceived, has been effected with the Lyceum, a paper travelling the same course as the Tracts, though presenting less massive materials. A tract will hereafter be a leading article in each number, accompanied by such essays, reflections, notices and facts, as were the characteristics of the Lyceum.

The editor, in assuming the care and responsibilities of this new form of both publications, wishes it to be expressly understood that he does not consider himself accountable for the *theories* of his correspondents.

Communications upon whatever relates to any department of science, the practical arts, and education, in this widely extended country, will have an early insertion.

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Public Lectures.—If this is rightly denominated the mechanical age, it is no less a lecturing era. This is as it should be; one man reads for a thousand, and instead of sacrifising the time of the multitude to read in search of a particular species of knowledge, one individual toils over the books, and at the evening lecture presents the results of his inquiries to the host of auditors. Never was a system devised, more happily calculated to elevate the moral tone of society—no, never. One must be stupid indeed, if he remains ignorant in these halcyon days.

Lyceums cannot exert the influence which they were designed to exercise, without a regular periodical course of lectures. In Boston, immense halls are filled every night in the week, and whatever is valuable, whatever is worth knowing, is clearly and successfully taught. There is not a town in the United States that should not have its Lyceum, and its regular course of lectures; nor is there a town so deplorably intellectually poor, as not to possess citizens, who might sustain the public exercises of these nurseries of intelligence.

☞A Request.—Among other contributions, we request gentlemen to forward to us their manuscript lectures, which have been given before Lyceums. And we moreover request young gentlemen or ladies, who have the leisure, to transmit a synopsis of such lectures as strike them as being particularly valuable. If they are accompanied by accurate drawings, necessary to the elucidation of the text, we shall have them engraved at once.

Any juvenile correspondent, who shall have furnished a synopsis of six lectures, which may have been delivered in any Lyceum in the United States, which are published in this periodical, shall be entitled, at the close of the year, to a richly bound copy of the work. The names of the authors of the lectures which may be published, as well as those who report the doings of Lyceums for these pages, will on no account be printed, unless permission is given by the writer.

Scientific Doings.—Within a few months, the Boston Society of Natural History have fitted up their splendid collection of natural curiosities, in a spacious hall, over the Savings Bank, Tremont Street, where the members meet every other Wednesday, for the transaction of the regular business of the Association. After the President has taken the chair, committees usually read reports. These commonly relate to such objects as were presented to the

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Society at the previous meeting. The whole world seems to have been laid under contribution; for as often as the members come together, the table is loaded with new and rare productions. Papers are read, and various extemporaneous communications are made.

This institution is one of deep interest to science, and will, no doubt, prove the nursery of many, who will at some future day exert a powerful influence in the field of Natural History.

Novel Machinery.—A few days since we were permitted to examine the operation of a machine, propelled by steam, for manufacturing *hooks and eyes*. It is a little affair, that might nearly be packed away in a gentleman's hat; yet its regularity of motion, and the simplicity of its contrivance, in making those crooked things with the rapidity of the ticking of a watch, all fit for a lady's dress, called forth our highest admiration.

The turning of gun stocks, shoemakers' lasts, and ox yokes, beside several other queerly shaped every-day conveniences, with which the farmer, the soldier, and the mechanic are familiar, must certainly be considered the *ne plus ultra* of native ingenuity.

There are several ponderous cast iron machines for sale in a loft in Broad Street, the invention of a yankee, for making common brass pins. A child, by turning a crank, for aught we can discover, might manufacture a bushel a day, all headed and pointed for use.

Admitting Ladies to the Meetings of Lyceums.—A 'fair' correspondent of the Belmont (St. Clairsville, O.) Journal, alludes to the 'policy' of the Lyceums of the eastern states in permitting ladies to witness and in many cases to take part in their exercises; and argues that the same policy ought to be adopted by the two Lyceums of that place. So far as our observation has extended, we have found this policy indispensable to the prosperity and perpetuity of these institutions. Indeed we believe it is allowed as a fundamental doctrine wherever we have seen them established, that the fairer portion of community are susceptible of, need and should be partakers of the improvement afforded by such societies, in common with the other sex, and that, at any rate, true *policy* demands at least their admittance to all the public exercises. We are glad to see by the Journal that the 'St. Clairsville Young Men's Lyceum not only permits ladies to become spectators, but partially to participate in its exercises—granting to those of them who feel disposed the privilege of handing in communications on any subject

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they may choose to write upon.' We hope this policy will be adopted universally by the Lyceums of the west, as well as in the other states of the union.

Malay.—This term, says Marsden, is like that of Moor, in India, and almost synonymous with *Mahomedan*. These people, he further says, (the Malays) are supposed to have come from the Peninsula of Malacca, and to have spread thence over the adjacent islands; whereas it is clearly proved that the Malays went from Sumatra to Malacca in the 12th century; and that the indiginous inhabitants, gradually driven by them to the woods and mountains, so far from being the stock from which the Malays were propagated, are an entirely different race of men, nearly approaching in their physical character to the negroes of Africa.

Two Native Races in Madagascar.—The island of Madagascar, which is cooled by the mild breezes of the Indian Ocean, and ought, therefore, it would seem, to contain a white native population, has two kinds of people; one is olive-colored, with dark hair, and the other the coal black negro. We should like an explanation of this curious physiological circumstance, from some of our scientific friends.

Red Haired Mulatto.—Blumenbach saw a mulatto with red hair. A man of mulatto complexion, freckled, with strong red hair, disposed in wiry curls, and born of black parents, was seen by Dr. Winterbottom.

Barking Dogs.—By a very slight puncture on the side of the neck of a dog, a skilful surgeon can divide a nerve which controls the vibrations of the vocal cords, and thus forever prevent the animal from uttering his characteristic voice.

Will some one inform us whether the doctrine which was promulgated by Capt. Symms, a few years since, has any supporters? and, further, what has become of Mr. Reynolds, his pupil, who returned from an expedition the last season?

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SCIENTIFIC AND LITERARY NOTICES.

BOSTON LYCEUM—The last Lecture before this popular institution was delivered by George S. Hillard, Esq. on Ancient and Modern Literature. It was listened to by a crowded audience with profound attention and deep interest; and although it was perhaps better adapted, in its design, for the critics than for the multitude, there must have been few in such an auditory insensible to the justness of the orators's fine comparisons and the liberality of his general views, as well as the frequent elegance of both the expression and the delivery.

THE YOUNG MAN'S GUIDE, recently published by Messrs. Lilly, Waitt & Co. and the CHILD'S ANNUAL, published by Messrs. Allen & Ticknor, we are glad to learn are justly appreciated as among the most valuable of the new year gifts of the season.

A SOCIETY called the Lowell Debating Club, has lately been formed in Lowell, consisting of mechanics and others; and, as the Album of that place says, is likely to 'go on and prosper.'

NAVAL LYCEUM.—A Naval Lyceum has been established at the Brooklyn Navy Yard, and is now in full operation. A room is occupied for a Reading Room and Library, where newspapers and periodicals are taken, and where any books would be acceptable. We hope this example will be extensively followed.

THE Gloucester Telegraph says that an excellent lecture on the Moral, Intellectual and Social nature of Man, was delivered before the Gloucester Lyceum by Mr. Babcock at a recent meeting—a subject exceedingly important to be understood by the mass of community.

THE Cavendish (Vt.) Academy appears from the last Catalogue to be in a flourishing condition. The course of instruction is 'designed to be liberal and thorough.' The lectures are illustrated by Chemical, Astronomical and Philosophical Apparatus, together with Maps, Charts, &c.

DR. DAVIS gave a Lecture on Friday evening last, at the Athenæum, on the Physiology of the Voice. Those who know the doctor, must be satisfied of his ability to interest an audience with any subject.

HON. MR. PICKERING'S Lecture at the Athenæum last week, on Language, was a splendid effort. Mr. Pickering is one of the most learned philologists in America—if not the first.

PROF. FARRAR'S lectures on Natural Philosophy, at the Temple, have been fully attended through the season.

LIEUT. PARK'S Lectures, at Chauncy Hall, we hope will be extensively patronised.

THE MECHANICS' LYCEUM of this city is in a far more flourishing condition this season than it has been before since its organization, three years ago. This speaks well for the persevering exertions of its members, they having had many difficulties to encounter, on account of adhering strictly to the MUTUAL improvement principle.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

JANUARY 15, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

ANALOGIES OF VEGETABLE AND ANIMAL LIFE.

BY EDWARD JARVIS, M. D.

EXAMINING carefully the internal structure of the perfect animal and the perfect vegetable, and observing minutely the manner in which both are fed and nourished, we find a very striking resemblance between the organs of digestion, circulation and respiration of both; for they display the most remarkable property of organized beings, as distinguishing them from dead inorganized matter—that of internal nutrition and growth. They receive into themselves foreign and dead substances, and change them within their own organs to different substances; throw off from themselves such as are not needed for the support of the being, and expose the rest to the air, or breathe upon it, and then from this select one portion for supplying the waste of the body, another for the growth, forming out of it all the varying substances which enter into the man or the tree.

This is but the faint outline; the resemblance will be the more strikingly observable when we shall trace out the minute details, which it will be interesting to follow, and see how nature operates by general laws; for it seems to be her delight, when she has one principle that answers a good purpose, to apply it to as many cases as possible; and in the seemingly almost infinite variety of individuals in her creation, we find comparatively few variations of internal character. But it is not to be supposed that I

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take it upon myself to show that the stomach of the animal corresponds exactly to a stomach in a tree: I only mean to prove that the tree digests, or rather changes the character of its food as well as the man; that in both cases the food is, before it is consumed by the tree or animal, a dead kind of matter, entirely different from any matter within the tree or animal; and afterward this is altered in its properties and becomes nutritious sap *(succus proprius)* in the one case, and blood in the other, and in both is ready to be made a part of the living body; and that in one case this operation is carried on in the stomach and alimentary canal and the ducts leading from the latter to the heart; and in the others it is performed in a set of vessels which lead from the roots to the leaves, answering, anatomically, to the vessels that absorb the chyle from the alimentary canal and carry it to the heart, and corresponding in function to the whole digestive apparatus.

Now, perhaps we may be laughed at as a visionary, with more imagination than rigid observation, if we say there is a stomach, or even an alimentary canal in the bush; but seeing that these changes are effected, which we must call digestion, it will not be too much to say, the tree has a digestive apparatus.

Granting, then, that there is not an exact similarity of organs, we shall find no difficulty in showing that they perform strictly similar operations, whatever may be the organs with which they work.

Animal Digestion.

To give a proper idea of this process, as well as to fulfil our purpose of comparing the digestion of both animal and vegetable, it will be first necessary to take a slight view of the stomach and alimentary canal, and the lymphatic system.

The mouth is the beginning of the digestive organs, and opens into the stomach by the gullet, which is a long tube, lying immediately behind the windpipe and in front of the back bone. The stomach is a long hollow sack, lying across the body just below the breast bone, and underneath the short ribs. Through an aperture near the

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left extremity it receives the food from the gullet, and at the other end, after it has digested it, discharges the chyme into the *duodenum*, which is the first of the bowels.

The alimentary canal varies in length in different animals, according to their different habits of life and kind of food, and the rest of their anatomical structure. In man it is about five times the length of his body—from thirty to thirty-five feet; in animals which live upon vegetables entirely, the ox, horse, sheep, &c., the proportion is longer; and in beasts of prey, whose whole food is flesh, it is shorter; for in the former a longer time is necessary for digestion of vegetables, and consequently this matter must be the longer retained subject to the action of the digestive apparatus; but in the latter, this is sooner accomplished, and therefore both the digestive process and its apparatus is the shorter.

The whole of this canal is lined with what is called the mucous coat, which is thick, soft, loose, and, in the lower bowels, thrown into folds. Those who have eaten *tripe*, will recollect the honey-comb surface of this excellent article of diet, and the reddish stringy fibres beneath this and the layer of fatty substance which forms the other surface. This is a good example of the stomach and its coats, which any one can see and examine for himself, and then will not forget its character; and we recommend any one who would know the curious workmanship of the human stomach to examine a piece of tripe; to see, first, the mucous membrane, with its complicated folds, which throw out the gastric juice; next, the muscular coat, which performs the motions and carries the food onward; and lastly, the serous coat, which is on the outside, and gives the whole organ its firmness and strength. This arrangement of the coats is nearly the same throughout the alimentary tube, from the gullet downwards; but the mucous membrane of the large intestines is thrown into more distinct folds than in the stomach.

We take our food at particular periods, and sufficient in a few moments to satisfy our appetite and wants for some hours. We take it, when we are hungry, and of our own will. This action is voluntary, and the interval is long. Our food is necessarily broken up in the mouth by the ac-

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tion of the teeth, rolled over by the tongue, and mixed with the saliva of the mouth, and then is swallowed through the gullet to the stomach. This mechanical division of the aliment, and the mixture with the secretions of the mouth and gullet, seems to be a necessary step in the work of digestion, and preparatory for the second step, which takes place in the stomach: so that writers on the diseases of the stomach attribute the aggravation, at least, if not the just cause of many of these, to the neglect of mastication of the food, and the crude mass being thrown upon the stomach, which is unable readily to do the proper work of the teeth in addition to its own. Hence it will be a matter of safe precaution for our readers to be careful not to swallow their food, before the mouth and teeth have faithfully discharged their duty upon it. The process of swallowing is curious in itself, and still more so as a manifestation of skill and design in the Former of our bodies. To give a full knowledge of it will involve more anatomical description than enters within the scope of this Tract; for we only wish to explain such parts as bear some general analogy to the vegetable processes; and this will be understood when we come to speak of the motion of the food in the bowels.

We have before stated that the inner lining of the stomach throws out the gastric juice, which is a powerful solvent for the food in this organ: by means of this, the aliment is soon reduced to a soft pulpy mass called *chyme;* its physical and chemical properties are both changed; it has neither the same external character, nor, on analysis, has it the same properties which belonged to the food before it was eaten.

Dr. Philip tried very many experiments on rabbits, to ascertain the particular mode in which digestion is carried on. He found that the food, when newly received into the stomach, was in a somewhat solid mass in the left and large extremity of the stomach: the gastric juice was thrown out from the surface, and mixed with the outer portion of the food, and soon this portion is reduced to chyme, soft and pulpy. Then the constant vermicular -tions of the muscular coat carried this digested sub- e towards the left end of the organ, when it passed

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through what is called the pyloric orifice into the first of the small intestines.

It is worth while to notice, in passing, the admirable contrivance of this orifice: at this place the calibre of the stomach is contracted to about the size of a finger. The fibres of the muscular coat are thickened here, and a strong belt of them surrounds this end, creating a narrow neck; and when contracted, this band closes entirely this end, and in states of ordinary health, obstinately keeps it closed, except when the digested food offers itself for passage; then, as if by a sort of intelligence, this faithful sentinel relaxes its hold, the mouth opens, the chyme passes through, but when the unchanged food offers, it closes until this is prepared like its predecessor. This finishes the second stage of digestion; and next comes the third stage, which takes place on the chyme, in the small portions of the alimentary canal.

We have now the food in the *duodenum*, the first of the small intestines, in the state of chyme. The next process is, to form *chyle* from this. This is done by aid of the bile which is sent in through a small tube, opening into this bowel from the liver; and still farther help is received from the *pancreatic juice*, which is made in the *pancreas*, a gland in the abdomen. What the precise nature of the effect of these liquids is, is not known; and physiologists have exhausted their ingenuity to discover, and their imaginations to invent ways, by which nature receives help from these organs; and, as if nature only meant to provoke our inquiries to show the narrow limits of all our knowledge and to baffle our vain hopes, all the painful experiments of the physiologists, all the laborious investigations of the chemist, and the unwearied observations of the philosophers, have fallen short of their expectations, and left them all in the dark, for they have not brought the secret out.

They have told us the chemical constitution of gastric juice, of bile, and of the secretions of the *pancreas;* we know how much carbon, oxygen, nitrogen and hydrogen these contain, and in what proportions they are combined together: we are equally learned on the character of chyle, and of the food from which the chyle is formed, on the

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one hand, and of the blood which is formed out of it on the other. But with all this insight into the matter, and knowledge of the intimate principles, we cannot from food make chyle, nor can we from the chyle make blood; nor do we find any process similar to it out of the living body. One man called it mechanical; for he supposed the stomach and *duodenum* rubbed their sides together, and ground down their contents as we would in a mill, or as we knead bread between the hands: others said that this was a fermentation, a concoction, a mere chemical decomposition and combination. Yet, after all their investigations and theories, they have not demonstrated that it is like any operation, chemical or mechanical, out of the living system. No; it is an operation peculiar to life; and some, and we think with the best possible reason, have called it a *vital operation*;—not pretending by this that they have explained the matter, but only to set at rest all speculation; for all admit that the specific qualities of vitality are altogether unknown, and probably must be forever beyond the vision of mortality. Whatever may be the cause, we find that soon after the chyme is received into the duodenum, it is separated into two portions; the nutritious, or *chyle*, and the innutritious, which is to be thrown off as useless.

This chyle is nearly the same in all animals; and the chemical analysis shows but little difference between that which is formed out of animal food and that which is made of vegetable food in the same animal; and even this small difference is almost entirely lost when the chyle goes through another operation, and is transformed to blood.

This finishes the third stage of digestion; and so far the animal exhibits a series of organs, at least, though not of operations, which find no counterpart in the vegetable: for the tree has no mouth like ours, nor gullet, nor stomach, nor alimentary canal, as the quadruped has, but it has a set of absorbents, like the *lacteals* of the animal, which we shall next explain.

Lacteals.

The inner coat of the intestines is filled with innumerable absorbent mouths, which are situated in the villous

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hair-like projections, which cover this lining like the nap of velvet cloth: each one of these hairs has a mouth, and a tube leading from this mouth into other and larger tubes behind. These tubes are at first inconceivably small; but they unite together, and form larger and larger trunks, like the roots of trees, and at last all unite into one, called the thoracic duct, which begins in the abdomen, passes up along the back bone to the upper part of the chest, and opens into the subclavian vein, just before this reaches the heart. As these lacteals are spread over all the inner surface of the intestinal canal, and as this surface is equal nearly to the skin of the whole body, every portion of our aliment must come in contact with some of them, and its chyle be absorbed by them. We cannot particularly explain their action: many have tried, and thought they succeeded: many have guessed at it, but still, in all their experiments and theories which they built upon them, 'they know but little, presume a good deal, and jump at their conclusion,' and would have us follow after them.*

It is sufficiently certain that these lacteals select only the nutritious chyle, while the rest passes onward in the canal. Rabbits and other animals have been killed soon after eating, while the work of digestion was in busy operation, and then these little mouths were found full and swollen, and the surface of the intestines covered with knobs. These contract and force their contents into the tubes behind them, and these carry the chyle onward through the successive small and large branches to the great thoracic duct, which delivers the chyle into the blood vessels near the heart.

While the food is digesting and the chyle taken up by

* Boerhaave supposed the peristaltic motion of the intestines aided the absorption of the chyle. Dumas thought each lacteal possessed an elective sensibility. Young ascribes this power to electricity. Richerand calls it all the effect of sensibility. Bell speaks of the appetency of the capillaries, and the discriminative power of the small vessels. Most physiologists of modern times admit of a certain species of elective attraction. Bichat conceives there is a vital action in which there is a relation between the vessel and the fluid of an elective nature. Tiedemann and Gmelin maintain that the absorbents and blood vessels possess a vital power, by which they propel their contents, but which is different from irritability. This seems the nearest to the truth, or at least to contain the least error; for it assumes to know nothing of the matter, but leaves it, as they found it, and as it really is, in the dark; for all the theories only load the subject with obscurities, which are neither clear of themselves, nor do they give any light on these secret operations of nature in the living system.

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the lacteals, the innutritious portion is carried forward in the intestinal canal. This has a muscular coat, the fibres of which pass in belts around it. These fibres successively contract and diminish the calibre of the tube. While this happens, the next band relaxes to admit the contents, which are forced out of the portion next above. This alternate and successive contraction and enlargement of the tube carries the waste of the food through its whole course. It is probably by similar means that the sap is carried onward in the tree.

This constitutes the whole process of digestion; and we have now the chyle in the heart, mixed with the blood, but not yet forming a part of it; for, in order to be perfect blood, ready for the support of the body, it must be submitted to the influence of the air in the lungs. But previous to entering on the explanation of this, which involves the whole description of respiration, let us see what we can discover in the vegetable analogous to the digestive process, which we have just described in the animal.

Vegetable Digestion.

The roots of the tree are covered with an infinite number of very minute fibres, which project from every part of the surface, like the lacteals in the alimentary canal: and like those lacteals within the animal body, these little roots without the vegetable body are absorbents, having each a mouth capable of living action, and a tube leading from this mouth into the larger root, and communicating with other and larger tubes, which extend from the root through the trunk and the branches to the leaf. This is the vegetable digestive tube, very simple, compared with the more complicated one in the animals, yet performing operations on its contents very similar to those heretofore described in the animal.

We perceive here a broad difference between the first part of the digestive apparatus of these two races. Dr. Waterhouse says that he 'knows no other distinguishing mark, which divides the animal from the vegetable, than that the one has a stomach for receiving and digesting food, and

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the other has none.' And another physiologist tells us that the animal may be considered as a being, which lives by internal absorption of food which has already been eaten and digested, while the tree lives by external absorption of the nutriment which is accidentally about its roots. The animal selects its own food by a voluntary effort, and prepares it for digestion; then, by the absorbents, it is taken up: here the anatomical analogy commences. The food of the tree is decayed vegetable and animal matter mixed in the soil and dissolved in the waters of the earth.* This absorption of food through the water is constantly going on. Animals take their food at various periods, and when the appetite is satisfied, they eat no more till this again calls for another supply. But the absorption through the lacteals, in the bowels, is almost continually going on, like that of the absorption from the earth by the roots. So we see, however wide the difference may be, so far as the mouth and stomach are concerned, yet a very great similarity commences immediately after the food has passed these. Both act by the almost infinitely small absorbents, which are not under the control of the will, and almost never cease their work.

If the lacteals of the perfect animal opened on its external surface, as is the case with some of the imperfect kinds, its operation would be like the tree. Or, if the tree had a sack about its roots, into which it placed, of its own accord, the food in some way prepared for the action of the little absorbing mouths of the fibrils on the roots, we should have a perfect analogy; but as neither of these conditions happen, we find the want of the stomach in the one case, and the presence of it in the other, affords a tolerable ground of distinction. Yet this organ seems not to be necessary in the tree, in order to accomplish what is performed by it in the animal.

If we could examine the sap at the moment it was absorbed from the earth, we should, without doubt, find it the same simple decayed vegetable substance dissolved in water, as is found in the earth. If we tap a root at a little

* Thomson's Chemistry.

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distance from these absorbent mouths, we find the same sap has changed a little, and presents some of the characters of the tree. If, again, we draw it from the trunk, we find that it is still farther altered, and assumes still more of the peculiar properties of the tree: and the higher we open the tree, the more distinctly do we find the change produced, showing a gradual alteration in all its progress from the root to the leaf; from the nearly tasteless water, with scarcely any sensible properties, and similar in all vegetables, to the strong and pungent sap, with properties differing in almost every tree of the earth. How is this change brought about? By what means is this water, with few particles of vegetable matter dissolved in it, made into sap of such different sensible properties? We know in what organs it is effected; for it is done while the sap is on its way from the root to the leaf, and consequently it must be by the action of these sap-vessels themselves. If it be allowed that the change of the food into chyle, which renders crude and dead matter fit to enter into and support the living system, is done by means of the stomach and alimentary canal, in which the process is carried on, we may as confidently say that the change of the simple aliment of the plant into the living nutritive sap is effected by the agency of the sap-vessels in the root, trunk and branches, out of which it has not passed. In the animal this is called digestion, and it will not be denied that the corresponding process producing corresponding results should be called by the same name, although effected in organs anatomically different: and we must admit an analogy of function of digestion, however much the digestive organs may differ in structure.

The glands of the mouth secrete the saliva, those of the stomach secrete gastric juice, and the liver throws out bile; all these secretions enter into and aid the process of digestion. So we believe that glands in the tree afford peculiar substances which enter the new sap, and aid its transformation from its simple to its more complicated nature.

Vegetable digestion, like that of the animal, produces changes on the nutrient matter entirely different

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from any operation out of the living body. We know the component parts of the food before it enters the roots; our chemists have analyzed the digested sap, and know all its properties; yet, with all this knowledge of the composition of both, no chemistry will enable us to make the one from the other: it is a process which can be carried on only in the living vessels of the living vegetable body, and which Nature refuses to unveil. In both animal and vegetable we know the original substance, and the results and the organs in which the work is done; the rest in both is equally unknown.

Quantity of Food and Nutriment.

The daily consumption of solid and liquid food amounts, on an average, to four or five pounds for every adult. The amount of chyle which is taken up by the lacteals cannot be more than a few ounces: the rest of the food is thrown off from the body as innutritious. This is the more remarkable in animals which eat only vegetable food, which contains a less proportion of nutriment than flesh, which is the food of beasts of prey: the same is observable in men who live on vegetables or on flesh. Man is nourished, not in proportion to what he eats, but in proportion to what he digests. This is true of all the animal race, and too obvious to every one to need farther observation.

The same law governs the tree; and all experiments show that it consumes much more food than actually nourishes it. The quantity of the sap is not diminished in its progress from the root to the leaf; on the other hand, it is very probable that it is increased by the addition of some of the peculiar juices of the tree, thrown into it to aid its changes. But, 'no sooner has the sap arrived at the leaves, than a great part of it is thrown off by evaporation. The quantity thus perspired bears a very great proportion to the moisture imbibed. Mr. Woodward found that a sprig of mint weighing 27 grains, in 77 days imbibed 2558 grains of water, and yet its weight was increased only 15 grains; therefore it must have given out 2543 grains.

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The same experiment was repeated by this philosopher on other plants. The following table shows the results.

	Weight.			
	When put in.	When taken out.	Gain in 77 days.	Water wasted.
Spearmint in spring water, - - -	27 grs.	42 grs.	15 grs.	2558 grs.
Spearmint in rain water, - - - -	23 1-2	45 3-4	17 1-2	3008
Spearmint in Thames water, - - -	28	54	26	2493
Common Nightshade in spring water,	49	106	57	3708
Lathyrus in spring water, - - - -	98	101 1-2	3 1-2	2501

These experiments demonstrate the great quantity of matter which is constantly leaving the plant. Dr. Hales found that a *cabbage* transmitted daily a quantity of moisture equal to about half of its weight; and a *sun-flower*, three feet high, transmitted in a day 1 lb. 14 oz. avoirdupois.'* This transpiration is carried on through the leaves; for when these were stripped off, in the experiments, very little or no water was lost. And the quantity of the transpiration depends very much on the kind of leaf. Those which are thin and loose, with a rough surface, evaporated a great deal, while those which had leathery leaves with smooth and varnished surfaces evaporated much less.†

This evaporation consists mostly of water, leaving the nutritious portions of the vegetable food in the leaf; as the innutritious portions only of the food of the animal are thrown off, leaving the chyle, which supports the frame. But neither the chyle which is now carried to the heart,

* Thomson's Chemistry, Vol. iv.

† I performed a set of experiments in July and August, 1830. I put 1000 grains of water into each of two cups, and covered one of them with a film of pig's-foot oil, and put both side by side in the sun. When the water was all evaporated from the cup containing no oil, the other cup had lost only one grain. I repeated this several times with the same result. I tried olive, whale, and neat's-foot oil, and found the loss very nearly the same; generally, however, exceeding by a very little that in the cup covered with pig's-foot oil. Presuming, then, that the loss by evaporation, if the surface were covered with the latter substance, would not essentially affect the result of the experiments, I cut branches of several kinds of trees, and

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nor the digested sap in the leaf, is fit for nourishment in the plant or the animal; for before this, they must undergo another change, which is accomplished by help of the air, by the process of respiration.

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immersed the ends in water covered with it, and kept them there until they began to wilt. I weighed both the branches and the water before the immersion, and again after I took them out. The following are the results of these experiments:

Tree.	Weight in grains.	Time immersed.	Loss of water in grains.	Loss of weight in branch.	Loss of both.	Waste of water per day in ratio of weight of plant.
Lime,	637	4 days.	1710	307	2020	2-3
Apple,	561	4	2030	51	2081	13-14
Alder,	727	2	470	286	756	1-3
Pine,	4930	9	2830	220	3050	1-16
Cherry,	534	6	890	97	987	5-18
Chesnut,	510	4	1260	21	1281	21-34
Oak,	2490	6	1970	1500	3470	11-83
Elm,	950	3	810	70	880	27-95
Flowering Raspberry (Rubus,)	820	3	2960	219	3179	1 1-6
Teucrium Conadcure with the root,	346	15	780	104	884	53-346
Teucrium Conadcure without the root,	292	15	1066	129	1195	71-292

Without doubt, this evaporation was more rapid when the branch was first cut from the tree, and more feeble as it lost its vitality. The cherry was perfectly wilted when taken out: if it had been weighed earlier, it would probably have varied the result, and shown a more copious transpiration. Neither the pine nor the apple were wilted. The leaves of the latter were moist and plump.

[TO BE CONCLUDED IN OUR NEXT.]

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[Furnished for the Tracts and Lyceum.]

IMPROVEMENTS IN THE ARTS.

About the year 1749, in Falmouth, now Portland, Me. a yard of calico, according to the depreciated paper currency then used, cost 35 or 40 shillings; and the wages of a laboring man were 25 or 30 shillings per day. A laboring man could then buy for his family by his day's work, only three quarters of a yard of calico; but now he can buy four or six yards. Cotton check was then 32 shillings per yard, or more than a man's wages for a day. Cambric was at the enormous price of 130 shillings per yard; or a common laboring man must work four or six days to buy one yard. Corn was at this time at 30 shillings per bushel; so that a family must give more than a bushel of corn for a yard of calico, and more than four bushels for a yard of cambric.

The improvements made in the arts have rendered such articles more abundant and cheap. A passage from the 'Working Man's Companion,' an English work reprinted in Boston 1831, will show this:—'Nearly twenty years after Arkwright had begun to spin by machinery, the price of a particular sort of cotton yarn much used in the manufacture of calico, was thirty-eight shillings a pound. That same yarn is now sold for between three and four shillings, or one twelfth of its price forty years ago. If cotton goods were worn only by the few rich, as they were in ancient times, and even in the latter half of the last century, that difference of price would not be a great object; but the price is a very important object, when every man, woman and child in the United Kingdom has to pay it.' The price is now sixpence a yard; but five years ago the average price was half a crown a yard. Forty years ago, it was six shillings a yard, or twelve times its present price. About 1750, or before Arkwright's invention, 'the quantity of cloth manufactured could not have been equal to one five-hundredth part of that which is now manufactured for home consumption. So that thirty-one people now consume sixteen yards of cloth, where one person eighty years ago consumed one yard. We ask you, therefore, if this

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vast difference in the comforts of every family, by the ability which they now possess of easily acquiring warm and healthful clothing, is not a clear gain to all society, and to every one of you as a portion of society? It is more especially a gain to the females and the children of your families, whose condition is always degraded when clothing is scanty; the power of procuring cheap clothing for themselves, and for their children, has a tendency to raise the condition of females more than any other addition to their stock of comfort. It cultivates habits of cleanliness and decency; and those are little acquainted with the human character, who can doubt whether cleanliness and decency are not only great aids to virtue, but virtues themselves. There is little self-respect amidst dirt and rags; and without self-respect, there can be no foundation for those qualities which most contribute to the good of society. The power of procuring useful clothing at a cheap price, has raised the condition of women among us; and the influence of the condition of women upon the welfare of a community, can never be too highly estimated. F. F.

[Furnished for the Tracts and Lyceum.]

THE CHEAP TRANSPORTATION OF BOOKS AND PERIODICALS.

THE present state of society demands a cheap system of conveyance for the diffusion of knowledge. The Post Office system, is too expensive. On this system conveyance must be more expensive, from its rapidity, than is necessary for all purposes. A vast number of publications now issued, are not required to be transmitted with great speed. As mail stages now usually run, they carry a load of 1000 pounds, at three times the expense of conveying the same load at a moderate rate. 'In England,' says the Scientific Tract on Rail Roads, 'every coach on the best roads that runs for twenty four hours, at nine miles per hour, drawing not over two tons, requires no less than 180 horses, or ninety each way. Less than twelve horses would

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carry the same weight, for the same time, at two and a half miles per hour.' In the mail stages of our country, weighing about a ton, less than a ton of passengers and baggage is usually carried. To transport this load at the rate ordinarily travelled, the horses are changed every twelve miles. To carry the load, therefore, thirty-six miles, twelve horses are needed. At the rate of four miles an hour, four horses would transport this load in waggons. At a moderate speed, therefore, a load of magazines and books would be conveyed at one third the cost of transportation by rapid mail stages. But there is no advantage in my having many of the periodicals I receive by a rapid conveyance. A system of baggage wagons transporting small articles over the country at a cheap rate, would, therefore, greatly facilitate the diffusion of knowledge. I wish to take the Biblical Repository; and find that four numbers weigh two pounds and ten ounces. I live rather more than 100 miles from Boston; and the postage of the whole, comprising 50 sheets, would be $1,25; while the freight, at the rate at which goods are commonly transported in wagons, would be a little less than 2½ cents. The postage of 40 numbers of the Temperance Recorder would be 60 cents; while the freight of the whole 40, if the papers were dried, and thus made light, would not be more than one cent. When the Post Office was established, there did not exist such a periodical literature as distinguishes the present age; and therefore the United States did not provide for such a conveyance of packets as is now needed. The law now in force, passed March, 1827, enacts, 'That no person, other than the Post Master General, or his authorised agents, shall set up any foot or horse post for the conveyance of letters and packets, upon any post road, which is or may be established as such by law. This law forbids such a system of conveyance of parcels as is contemplated in this article, unless it should be established by the Post Office department. But if it should not be thus established, it may be authorised by act of Congress. Why should booksellers, and printers, and publishers be shackled in their business, more than other classes of the community? A vast amount of the literature of the country is now periodical. We have our Weeklies, our

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Monthlies, our Quarterlies, and our Annuals without number. We have our Libraries, too; the Christian's library, the select circulating library, and a variety of others. It is desirable that there should be a regular and cheap conveyance of such books. The difficulty of distributing periodicals over the country is of the nature of a heavy duty on them. The postage on a periodical, which does not convey news, and needs not be carried post haste, now greatly increases its cost, and checks its circulation. If shoes, and hats, and other articles of manufacture could be conveyed only by government lines, at the cost of 33 per cent on their value, the manufacturers would be exceedingly embarrassed; and the public, too, would be injured beyond calculation, especially if the manufacture could be carried on only in one place in a whole county, or in a whole state, as is the case with books and periodicals.

[From the Transactions of the N. Y. Lit. and Phil. Society.]

INDIGENOUS ANIMALS.

It has been doubted whether red foxes, mice, rats, the common black fly, the Hessian fly, the honey bee, fleas, moths, bed bugs, and cockroaches, are indigenous to this country.

It appears that the unanimous testimony of the Indians is, that the red fox did not make its appearance until after the Europeans had settled the country, and this was after an extraordinary cold winter, when all the sea to the northward was frozen. Hence it has been inferred that it came over from the north of Europe or Asia, on the ice. Another account is, that a gentleman of fortune, in New England, imported a number for the sports of the field, at the first settlement of that country, and that from this stock, was propagated the race. It is well understood that our red fox is the same as that of the old world. Kamschatka abounds with them; and when Commodore Bering landed on the western coast of America, he saw

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several; and Lewis and Clarke also observed them on the west side of the rocky mountains. A very severe winter may have driven vast numbers from the regions of the north into the lower country, about the time mentioned by the Indians, as it frequently has other animals, and particularly squirrels, deer, and bears. Severe cold produces famine, and famine causes the migration of men, as well as of other animals. Little credit is to be reposed in the opinions of savages on such subjects.

Almost all the other animals have probably been imported, but this does not disprove their being also aborigines of America. Fleas have been found on gray squirrels and rabbits, killed in desert parts of the country, where no human creature ever lived; and in new settlements made on pine lands they abound. The cockroach, or blatta orientalis, is said to have been imported from the West Indies; but, on the other hand, it has been found in the midst of woods and deserts. The common mouse and the rat have also been seen, at an early period, in the crevices of stones and subterraneous grottoes in remote mountains, where no human being had ever been before. The black rat is, probably, a native of America, and the gray rat imported from Europe.

[Furnished for the Tracts and Lyceum.]

WATER POWER.

There falls in some parts of our country, annually, water in rain and snow to the depth of 35 inches. In Boston, in 1818, 38·24 inches fell; and in 1819, 35·47. In New Haven, in 1818, 38·10 inches fell. Suppose that the quantity is 35 inches yearly. Then, on an acre there falls more than 219 millions of cubic inches, or, accurately, 127,050 cubic feet. If all this water could be secured on elevated ground, and made to operate for thirty feet in its descent, it would do the work of one man laboring 351 days, six hours a day. Considering the advantage that may be taken of this power, by employing it as you

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please, it is worth one dollar per day; and deducting the cost of the dam, &c., and the wear of machinery, it will be worth fifty cents a day, or 175 dollars a year, or a capital of 2916 dollars. A space of ground 113 feet square and 10 feet deep would contain all this power at once. If but half the rain that falls could be collected, then what descends on two acres would do the work of one man through the year. If but a quarter part could be preserved, then four acres must be used to collect sufficient. I recently visited a saw mill; I descended into a deep valley to reach it; and there, a fall of a few feet carried the simple, but heavy and powerful machinery, which is so useful in preparing the growth of the forest for our habitations. I inquired of myself, while about this spot, why we suffered all this water to descend so far, before we availed ourselves of its power. Why do we allow it to descend 50 or 100 feet, and then stop it but 10 or 15 feet above the bottom of its descent? The practical philosopher, who shall teach our citizens how to avail themselves for practical purposes of the little streams of water that are now descending our hills with idle murmurs, will confer an incalculable favor on the nation.

The amount of water power in a small stream of water constantly running, is exceedingly great. Suppose that there is an orifice, an inch square in extent, in a cistern, and two feet and eight inches below the surface of the water in the cistern, which, by being constantly supplied, is kept at the same height; then in one sixth of a second, supposing there is no resistance from the air, and that water is a perfect liquid, twelve cubic inches of water will flow out; and in six minutes and four tenths a hogshead of 100 gallons would run out, or 225 hogsheads in 24 hours. This acting on machinery for 20 feet, that is, over a fall of 30 feet, would do in a day the work of twenty-five men laboring eight hours, according to Smeaton's estimate of the strength of ordinary English laborers.

This calculation will give us some idea of the great value of a small stream of water constantly flowing down a hill. F. F.

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LETTER TO THE EDITOR.

Savannah, (Ga.) Dec. 25, 1833.

My Dear Sir:

By the circular and proceedings of the 'Teachers' Society of Georgia,' and by a few incidents I will mention, you will learn something of the state and progress of education in this state. The members of the Society are scattered over the great state of Georgia, some of whom travel from one to two hundred miles to attend its meetings. Among the members are some of the most spirited and able teachers in our country; highly qualified already, and, like every well qualified teacher, they are not satisfied with any present attainments. Their motto is Onward, and still onward and upward.

No subject which came before the Convention inspired the members with so much animation, or confidence, or courage, as County Lyceums. Most of those present gave a pledge that such societies should be organized in their counties, and that they would endeavor to induce their friends in other counties to 'go and do likewise.'

The manual labor system, which is a prominent object of County Lyceums, has already been so far tested in this state as to leave no doubt of its soundness, or of its general extension as the foundation of education in all its forms and departments.

Intimately connected with the manual labor system are circuit schools, to be held weekly, semi-weekly, or semi-monthly, as teachers can be procured and sustained. This system has secured the confidence, so far as I know, of every individual to whom it has been suggested. It is thought to be admirably fitted to the south and west, and to every place in our country, and upon our globe, where the population is sparse and the means for daily instruction not abundant.

Three manual labor schools are already in successful operation in Georgia, and several others are in progress: and, if teachers could be procured, one, at least, might be established forthwith in nearly every county in the state. Several applications have been made to me for teachers by persons disposed and able to furnish all the pecuniary

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means for establishing schools upon the most liberal principles. If eleven hundred teachers, well qualified for the enterprise, could be procured, every county in the Union might have a Lyceum Seminary, and with it the most favorable facilities for educating their children and diffusing knowledge among all classes of their community.

Yesterday I attended a circuit school under the charge of our mutual friend, Mr. T. S. Clay, of Bryan County, who commenced it on his return from the north, a few weeks since. His success has been far beyond his anticipations. He travels nine miles to attend his school, and some of his pupils go the same distance, several of whom are accompanied by their mothers. Their progress is evidently more rapid, and their improvement more thorough, than that of one child to a hundred in New England, who attend school six days in a week, instead of half a day. If more experiments were needed to prove the entire feasibility, or the great importance of the circuit system, this would of itself be triumphant. Considering the circumstance that Mr. C. is not a teacher by profession, his success is certainly remarkable, and furnishes a comment on the system, worth more than many written volumes. It must and will be introduced, speedily, not only in the eighty-nine counties in Georgia, but in the eleven hundred counties in the United States.

Itinerating Libraries, as proposed in the circular, meets with the decided approbation of those who have examined the plan. One is already commenced in Bryan County, and upon such a plan that every family can have a constant supply of books at an expense of a few cents annually. Arrangements are already made to BEGIN in this part of the enterprise by putting into every family in that county a sheet of diagrams with one or two little tracts or manuals to explain them, which together must operate as leven, and with so much power, that the whole lump will soon be levened.

One of the most interesting experiments I have ever witnessed, of any kind, is the intellectual and moral experiment carried on by Mr. C. and his sisters on his own plantation, among his own people, amounting to one hundred and forty. The rigor of the laws in Georgia,

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produced by the imprudence or infatuation of individuals at the north, has deprived them of the privilege of instructing those intellectual and moral beings whom God has placed under their charge, in letters; of course, they cannot teach reading or writing. They are consequently confined to oral instruction, which is given daily, and with the happiest results, both upon the happiness and the industry of this little republic; for so it may be called; and, as it seems to me, one of the purest republics, and one of the happiest communities with which I have been acquainted. I am sure that no one can be so blinded, even by prejudice, as to believe that Mr. C.'s slaves would be rendered more happy, that they would not, many of them, be miserable, by becoming slaves to some cruel master, if they were *compelled* (for compulsion would be necessary) to be set free from the protection and the wholesome restraint of their present master, towards whom their hearts are warmed and enlarged with the enlivening and expanding principle of gratitude. I hope I shall not be understood, by these remarks, to justify slavery; for I abhor it from the bottom of my soul; but I believe that some of our most cruel masters are those of our own choosing,—some heartless demagogue, alcohol, avarice, revenge, ambition, or some other vile passion.

I expect to leave this place for the 'up country,' in a day or two, where the most favorable opportunities will be afforded by the Georgia Conference of Methodist Clergy and other similar occasions, to forward the objects of my visit to the south, which have so far been accomplished far beyond what I could anticipate. You will hear from me again soon. Yours, J. H.

[Furnished for the Tracts and Lyceum.]

RAIN WATER.

In our country there falls rain, including melted snow, to the average depth of 35 inches. On a surface 40 feet square, there falls yearly 34,909 wine gallons; and if

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all this were secured in cisterns, there would be nearly one hundred gallons for every day's consumption, or about three barrels. This water, if well preserved, would be the very purest and best for most domestic purposes. The horse and the cow prefer rain water to pump or well water; and though I would not be entirely governed by their decision, yet great respect is due to their judgment in such matters. The water of many wells is tinctured in such a way as makes it less fit for a solvent; and it does not so perfectly combine with nutritious substances, to form chyle, and nourish the human system. They who live in situations where water is not easily procured from the ground, may be told that the purest water is descending around them; and if they will only be at the necessary expense to secure this gift of heaven, they may provide an abundant supply. On such reservoirs, the inhabitants of Palestine placed much dependance; and it is a merciful appointment of God, that in warm countries, where the greatest supply of water is needed, the most rain descends. We may yet find good capacious cisterns, of brick or stone and Roman cement, economical additions to our domestic conveniences. A cistern 10 feet square, and 10 feet deep, would contain 118 hogsheads of 63 wine gallons each, and would secure to most families, a constant supply of water. F. F.

[Furnished for the Tracts and Lyceum.]

QUADRATURE OF THE CIRCLE.

For about two thousand years, ingenius mechanics and mathematical visionaries have been trying to square the circle; but, as yet—theories to the contrary—we have never seen a man who could take a round ball, and so chip it off on four sides as to make a square block, and have nothing left.

The squaring of the circle, whenever accomplished, will consist, in reality, in turning a cube into a ball, or a ball

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into a cube, whose sides will be exactly alike, as it respects the external superficies, without any loss of matter by the transformation.

When a column can be made to stand on both ends at the same instant of time—when two balloons, of equal dimensions, can, presto like, be made into one, whose capacity shall be only that of one of them, without increase of weight or of matter—when a man can absolutely occupy two places on the earth at one and the same moment—then we may expect the problem will be solved, and squaring the circle will be the every-day amusement of the school-boy.

I have noticed in the public papers that a Mr. Thompson, of your literary emporium, has discovered the long-desired and long-sought-for thing:—indeed, he positively says in his advertisement, that the quadrature of the circle has been finally discovered by himself; but as he does not yet explain to the public the process, I entertain the opinion, that however sincere he may be, he has greatly deceived himself.

Hoping that these remarks will reach the ears, eyes, or some other of the external senses of Mr. Thompson, a great object of this communication is to elicit from the discoverer the facts in the case, that the whole community, from Maine to Georgia, may cry *eureka* altogether.

Again, it is particularly desirable that Mr. Thompson should explain to the understanding of common readers the utility of the discovery, and its application in solving some of the intricacies of the laws of nature.

These remarks and inquiries have for their object the investigation of the truth of the mathematical problem of Mr. T., who is either Archimædes redivivus, or a philosopher, lost in a forest of his own signs and tangents. In a word, pray Sir, give Mr. Thompson a respectful hint of your correspondent's doubts, and say to him furthermore, that a paper is looked for from his own pen in your next number.

S.

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We thank our correspondent F. F. for the articles already received from him, and for his offer of future contributions. In a letter to the Editor he makes the following remarks:

It appears to me that *domestic* industry, and *domestic* education ought to be earnestly promoted; for none can fill the place of parents in the government and care of the young. When, therefore, industry is public rather than domestic, in large factories rather than in private houses, the young are removed from a supervision they greatly need, and are exposed to many evils and dangers. In addition to this, the labor of many is lost, as, from necessity or choice, they will not leave home; whereas, if industry were domestic, the labor of these would be productive. All those improvements in the arts which aid domestic industry are therefore specially to be encouraged.

Those means of communication also which give to families in remote country situations the advantages of populous neighborhoods, would greatly promote domestic happiness, and virtue, and mental improvement; for the necessity of the poor crowding together that they may be near their work, is thus avoided, and the inconveniences and corrupting influences of the thronging of many families into a compact neighborhood are thus escaped.

I have been led to examine this subject; and I propose, for the ensuing year, to make some communications bearing directly or indirectly upon it.

To the Editor of the Tracts and Lyceum.

Some years since, while rambling among the mountains of Pennsylvania, I came to a spring, from which ran a little brook into a neighboring stream. The water was very clear, and bubbled over a bottom covered with small hard stones of various tints. As I stooped to drink, having no vessel to dip in the basin, I perceived what appeared to be a cylinder, about a quarter of an inch in thickness and rather more than an inch in length, forming a curious

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mosaic work of small, colored stones. On inspection, I found that its appearance was not essentially different from the reality. It had a hollow bore, open at one end and sealed at the other, which was perfectly smooth and cylindrical, formed by small, irregular stones, of a variety of colors, which were more or less uneven on the exterior. I conjectured that it had been inhabited by some insect, though there was nothing to justify such an opinion but the unreasonableness of supposing that it could have been caused by accident. On further search I found several more, varying in neatness of construction, but not greatly in size. I took them to my temporary lodgings; but, in travelling homewards, some days after, on horseback, I found that the stones had been jarred asunder in my pocket. I may here be speaking of what is generally known to exist; but having never seen anything of the kind before or since, nor any one who had, I have ventured to make this communication. Yours, &c. H.

To the Editor of the Tracts and Lyceum.

To a query in the last number a correspondent replies, that it is understood that Mr. Reynolds, the pupil of Capt. Symmes, in company with Mr. Watson, left the exploring brigs Seraph and Anawan, and explored a large portion of the interior of South America, including the country of the Auraucanians. Mr. Reynolds is now with Captain Downes, in the Potomac, as his Secretary. These gentlemen are said to have discovered the remains of ancient cities, &c. in that region, which has continued until this day under the dominion of the Aborigines. The Auraucanians are mentioned by geographers as being a warlike race, whom the Spaniards never could subdue. Both gentlemen took notes, &c. of the voyage and subsequent explorations, which will, without doubt, be submitted to the public as speedily as possible after Mr. Reynolds's return. It is possible that their discoveries may be as interesting, though, assuredly, not so important and glorious, as those of Ross and Lander. L.

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ORIGINAL MISCELLANY.

SCIENTIFIC DOINGS.—At a regular meeting of the Society of Natural History, Tremont Street, on Wednesday, Jan. 1, Wm. B. Fowle, Esq. in the chair, the following comprised the business of the sitting. Only a few members were present, which accounts for the paucity of our minutes.

Upon the table, presented since the last *conversazione*, was the under jaw of a young elephant, and the tail and jaws of a sting ray. Only a few reports were made upon subjects given out two weeks before. Mr. Emerson, on birds, remarked that he had not been able to ascertain the name or character of one of the two specimens assigned him. The other, which he held in his hand, was the *scolopax flavipes*, or yellow-legged snipe, of whose characteristics and habits he gave many interesting particulars.

Dr. Otis spoke in relation to the skull of a wild boar, recently received, which he seemed to think belonged to a species which had not been well described. This was from Madagascar,—so we understood him. It had six upper and six under incisors, or cutting teeth; whereas, several varieties of the animal possessed none at all. The tusks in the skull to which he adverted, were four in number, and really formidable weapons, appearing, externally, like those of the hippopotamus, though very much smaller. He interspersed many interesting facts, in connection with the anatomy of the head, the particulars of which we were unable to commit to paper as fast as they were given. He proposed to take further time for consideration, and gratified the Society with the prospect of a more elaborate report at a future day.

Mr. Tappan, to whom was committed several birds, of the falcon family, was interestingly minute in the external characteristics of the several individual specimens. Here, we regret to confess, that we were not swift enough with the pen to record his language as speedily as necessary, to give a synopsis of his observations.

Dr. E. Warren, a gentleman of nice discrimination, read a valuable paper which related to the skull of a tiger, recently deposited in the cabinet by Dr. Lewis. The writer discovered a perfect knowledge of the natural history of the feline species. The minute observations made on the number, position and office of the teeth, exhibited no ordinary powers of discrimination. The living animal of the genus to which the skull of which he was speaking belonged,

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might always be known by the dark transverse bands on the body. One of these huge and ferocious cats had been known to seize a man in his mighty jaws, from a horse, and make his escape to the forest with the prey, before any relief could be afforded.

Mr. Wigglesworth was not in readiness to make a report. Mr. Dixwell, in a felicitous manner, gave his opinion of a work on natural history, recently added to the Society's library.

Dr. Gould read a paper on the cultivation of *nutmeg*. Beautiful specimens of the nut, in the original pods, from the Moluccas, were passed round the room.

A block of stone, from the Giant's Causeway, was announced as a present to the cabinet from the Rev. Mr. Malcolm. This is the third block from the same remarkable locality, which this gentleman has placed in the Society's room. Adjourned.

Boston Wesleyan Lyceum.—This Association continues to sustain the interest which its early operations excited. Its members manifest their continued confidence and pleasure in its system of mutual improvement by their general attendance at its regular meetings, and by their personal exertions to render them profitable and agreeable. Three series of lectures, by members of the Lyceum, are now in the course of delivery before the Society. The subjects are, Anatomy, Natural History and Natural Philosophy. They are presented in order, every three weeks, and hence there is a lecture every week, unless the lecture is suspended to give place to a public debate or some other change of exercises.

Nor is this infant institution forgotten by the public. It has received two boxes of minerals, one from the Wesleyan University, Middletown, Ct., the other from a gentleman in Strafford, Vt., the site of the valuable copper-mines. At a recent convention in this city, called with the hope of promoting the formation of similar associations, resolutions were passed, approving this institution, and recommending it to the attention and imitation of other Methodist societies. Since the time of this convention, one Lyceum, at least, (the 'Providence-Wesleyan Lyceum,') has been organized as a result of the efforts of this association. Its founder, the Rev. Mr. Horton, of Providence, says—'From the short experience of about six weeks, we can cordially unite with our brethren in Boston in recommending their formation wherever practicable.' It is the uniform testimony of the members of the B. W. Lyceum, that it is

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an important means of entertainment and instruction; and, feeling no discouragements, they are resolved to persevere in their laudable enterprise.

PERPETUAL MOTION.—From immemorial time, ingenious mechanics have been laboring to produce a self-moving machine. A principal object has generally been to avoid friction; but after all, the models of what they designed, have been more complicated than a church organ:—wheels, cogs, pinions and weights, in the greatest abundance, notwithstanding the *to-be-avoided* friction, necessarily suffered in their movements from this very cause. If the discovery of a perpetual motion is ever made, it is probable that the mechanism will be excecdingly simple.

We have been permitted to examine a ponderous mahogany wheel, in this city, about seven feet in diameter, loaded with monstrous iron blocks, sliding from the centre to the circumference, which the inventor sanguinely expected would whirl on its axle like a top, when completed. However, owing to various discouragements, miscalculations, and misconstruction, the perpetually revolving wheel was never completed—nor will it be.

We possess a model of another *perpetual motion*, which has no motion at all, which is beautifully wrought, and exhibits an inventive genius, unaccompanied, unfortunately, with a knowledge of the first principles of natural philosophy.

The bump of constructiveness, undisciplined by philosophical lessons, is an ignis fatuus, that seduces the half-taught mechanic into labyrinths of perplexity, pecuniary losses and domestic unhappiness.

SCHOOL APPARATUS.—As we pass the book-store windows in Washington Street, it is impossible not to stop and gaze upon the splendid miniature models which are manufactured for the use of schools. Surely, if the next generation are not wiser than their inventive progenitors, it will be a stupid epoch indeed. From the fig. 1 to the highest departments of mathematics, models have been prepared to make the matter easy of comprehension. Steam engines, that might be packed away in a sugar-bowl, may be purchased for a sum so trifling, that tolerably well patronized schools are inexcusable not to possess one. The mechanical powers, which a few years since were only occasionally seen in the college lecture room, may be bought for a few dollars. Pneumatic apparatus,

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which, by the way, is all-important for the teacher, is so nicely and economically constructed, that we cannot doubt that it will be found in every school house in the United States.

In a word, we strongly recommend school committees, as well as instructers, to make themselves thoroughly acquainted with the value of these contrivances for facilitating the acquisition of useful knowledge.

History of Volcanoes.—Dr. C. T. Jackson gave a lecture on the history and character of some of the principal volcanoes of Europe, on Thursday evening, January 2, before the Boston Lyceum, Boylston Hall. He has also given the same discourse before the Franklin and other societies, with equal success and satisfaction. He illustrated the lecture by beautiful drawings and one transparency of Vesuvius in a state of eruption. Lastly, the doctor presented a miniature volcano, out of the crater of which, flame, sparks, smoke and ashes belched forth in terrible grandeur. On the whole, it was one of the best exhibitions, illustrative of the subject, we have ever witnessed. Pictures are poor things to represent burning cinders:—the real brimstone odour, subterranean rumblings, vivid scintillations, and the explosions accompanying the corruscations of terrible light, convey a just idea of nature's mode of operation; and to us, who live in a quiet section of the world, where burning mountains are only known to exist on the pages of books, such a display as Dr. Jackson's was well calculated to excite the most intense degree of interest.

Hieroglyphics.—The Hon. John Pickering is now giving his very learned lectures on the hieroglyphical language of the ancient Egyptians before the Boston Mercantile Association, at the Athenæum. The simplicity of this gentleman's mode of explaining the figures of animals, so as to make words and sentences, is truly admirable. We really wish it were possible for Mr. Pickering to visit that land of wonders, which was considered even *old*, when Herodotus visited the pyramids, two thousand years ago. With Champoleon's book in one hand, and his own vast store of philology, he is the man, above all others, who should travel up the Nile. Why has not some savan hinted this matter to the learned gentleman? It would indeed be a glory to our country, if Mr. Pickering could stand among the everlasting monuments with which he is so familiar.

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THE second Annual Meeting of the YOUNG MEN'S ASSOCIATION FOR THE PROMOTION OF LITERATURE AND SCIENCE was held last evening, when the following officers were chosen for this year:—GEO. S. HILLARD, President; B. B. THATCHER, Vice President; GEO. W. LIGHT, Cor. Secretary; GUSTAVUS HORTON, Rec. Secretary; EDW. BELKNAP, Treasurer.

The object of this Association is, Mutual Improvement and the general promotion of Literature and Science. The Corresponding Secretary will be gratified to receive communications from any part of the country.

A PROJECT is on foot in this city for the erection of a new public building, to be called, probably, the TEMPLE OF EDUCATION, containing one large lecture room or more, and several smaller ones, such as the various societies require for their respective purposes. We think the wants of the community call for such a building, and have no doubt that there will be spirit enough to secure its erection.

THE COLONIZATIONIST.—Our friend Thatcher, the Editor of the Colonizationist, is certainly one of the most indefatigably industrious men in Massachusetts. With all the vexations of a daily press, he regularly sends forth this periodical, so well stored with important original matter, that it would lead one to suppose that he engaged in nothing else. It is an excellent work, and should be subscribed for by every man of intelligence.

MUSIC.—Henry R. Cleaveland, Esq.'s lecture, Friday, Jan. 3, before the Institute, on Music, was just what might be expected from a profound scholar. We hope some way will be devised by which the manuscript may get into the hands of our compositor, that all the patrons of this Journal may participate in the exquisite harmony which the audience enjoyed at the Athenæum.

MR. D. J. BROWNE, the Naturalist, who for some time conducted a periodical in Boston, called the *Naturalist*, is now travelling in Europe. We received a letter from him, not long since, dated at Teneriffe. Extracts will be made from his journal, from time to time, as it comes to hand.

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Prof. Hitchcock's Report.—We have been waiting many weeks for an elaborate notice of this valuable work, but regret to say that nothing has yet appeared sufficiently satisfactory. Perhaps, as was the case with reviewers of the Mechanic Celeste, of La Place, in England, *six men* have not yet been discovered, who are capable of doing it justice.

Lectures on Practical Engineering.—We heard Lieut. Park on Monday evening, Jan. 13, at Chauncy Hall, and can cheerfully and heartily recommend his course of lectures to the public. He is a scholar, whose claims should not be undervalued in a city like Boston.

To Correspondents.—Mr. Loring's paper, highly valuable, on Modern Prussia, has been received, and will be in type at an early period.

Dr. Davis's lecture on the early geographical discoveries in America, is on file. We feel greatly indebted to the author.

☞ Remarks on the Natural History of Man, is rather obscured by a hazy atmosphere. We like to have our communications so well arranged that it will not be necessary to carry a pocket compass to find the ideas.

The generic characteristics of the *Sepia*, genus Vermes-Mulluscus, is on the table. All such articles are appropriate, and will command attention.

Why does not our friend Dr. Willard, of Charlestown, one of our very best writers, send another roll of his ingenious lucubrations? His pen, like the dip of the needle, always points the right way.

Dr. Jarvis, of Concord, is a welcome guest.

Matters and things about the anatomy and habits of land tortoises, like the reptile itself, are crawling towards a future number.

Mr. Smith, of New Hampshire, must not be impatient; he is by no means undervalued. His essay will appear in course. Every word from that industrious scholar is weighed in a pair of scales, and readers may always rely upon having a just weight of practical facts.

'*A Lover of Nature*' is love-sick with the dame. There is no such thing as taking philosophy by storm. Be more gentle, prithee! —when the sky falls, you may take larks.

Who will undertake to furnish a catalogue of the Lyceums in Massachusetts?

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

FEBRUARY 1, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

ANALOGIES OF VEGETABLE AND ANIMAL LIFE.

[CONCLUDED FROM PAGE 49.]

RESPIRATION.

THE *lungs* of animals are the spongy, soft, light-colored bodies situated in the chest, commonly called *lights*. They are composed principally of air vessels and cells, and the blood vessels leading to and from the heart. The windpipe is divided at the top of the chest, and one division goes to each lung: these divide again and again, until, at last, the extremely minute tubes terminate in little cells, into which all the air is sent. One set of blood vessels lead from the heart; at first large, and dividing into smaller and smaller tubes, till very minute extremities end in little cells, which are in contact with the air cells: from these proceed other minute tubes, which unite repeatedly, till they form large trunks that open into the heart, which is situated between the two lungs, in the middle of the chest, under the breast bone.

The *leaf*, like the lungs, is mostly composed of a tissue of vessels and cells. The ascending vessels go from the root through the trunk and branches, and in small bundles through the foot stalk to the leaf, where they are distributed to every part of this organ. In a partially decayed leaf, which we find in the autumn, or which we may macerate in water, all the pulpy portion of the skin of the leaf is

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gone, leaving only a net-work, which is rigid and open. This is the system of vessels which composes the ribs and all the frame-work of the leaf. The under surface is covered with exceedingly small apertures, through which the superabundant sap is thrown off. The upper side is also filled with almost innumerable little openings, which penetrate through the bark of the leaf to a cell beneath it, into which the air is admitted. These are the air cells, in contact with the sap cells, so small and so closely set together that Mr. A. T. Thompson counted 55,296 of them on a square inch. These leaves constitute the breathing apparatus of the plant, analogous to the lungs in our own bodies, and performing similar functions, as we shall soon explain.

Of the precise nature of the air cells and sap cells in the leaf, and of the air cells and blood cells in the lungs, and of their specific mode of action in both, we are equally ignorant: we only know of certain effects produced on the sap in the one, and on the blood in the other, which are the consequences of respiration.

The *blood*, having served its purpose of nourishing the body, is returned through the veins to the right side of the heart. It is then loaded with the exhausted particles of the body which have been taken up with carbon, and also with the chyle which was poured into the vein just before it opened into the heart. Before this blood can again be of service to the living body, it must be purified of its carbon, and its new portions must be converted into blood. For this end it is sent into the lungs, into the minute blood cells, and there comes in contact with the air which is in the contiguous air cells. We are continually receiving fresh portions of air into the lungs. In this state the air contains oxygen, but when it is expired it has lost a part of its oxygen, and is loaded with carbonic acid gas. This new combination must come from the blood: and we find that this fluid, which before had a superabundance of carbon, now has lost it, and is changed from the purple hue of the venous blood to the crimson color of the arterial. The carbon of the blood and the oxygen of the air have united together and formed the carbonic acid gas, which

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is expired with the air. The blood is changed in its vital properties and rendered fit to nourish the system, and is taken up from the cells, carried through the minute to the larger vessels, and thence back to the left side of the heart, where it is ready for the general circulation.

The *sap* is deposited in the sap cells of the leaf. Contrary to the venous blood, it needs more carbon. From the respiration of animals and other causes, the air always contains some carbonic acid gas. This is absorbed by the air cells of the leaf, and there it is decomposed, and the carbon and oxygen separated. The former is added to the sap, while the latter is thrown out, and purifies the air. This is the process in the day time and in presence of light. But in the night or in the dark, the oxygen is added to the sap, and the carbon again returned to the atmosphere. But the plant takes up more carbon than it gives out; so that, although it changes the air, yet the specific effect of its respiration is opposite from that of the animal on the air. But the presence of air is necessary for both, in order to enable their respective juices to maintain life. Both have the organs, and carry on the function of respiration.

Circulation of the Blood.

The whole system of the heart and blood vessels and their operations, are so well described in Tract No. xix. Vol. iii. that it will be unnecessary to go through anything more than a cursory view of the matter, and point out the analogies and descrepancies between this and that in the vegetable, which we will explain the more minutely.

The *heart* is the centre of the circulation. It is a large muscular bag, with cavities on each side. That on the right side receives the blood from the whole system and sends it to the lungs for renewal and purification, as heretofore described: the left cavity receives it from the lungs and sends it to the whole body. From the left side then proceeds a large blood vessel called the aorta, which is divided, and the divisions subdivided again and again,

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until the last branches are inconceivably small, and ramify throughout every portion of the body: and indeed, so small are they, that their existence is not detected by the knife or eye, but only known by the necessity of the blood passing through them. This is the system of the arteries, which carry the blood from the heart, and constitute only half of the general system of circulation. Next, the veins return the blood. At first these are exceedingly small, like the last arteries, and the little vessels join together, forming larger tubes, till they are united in two, which open into the right side of the heart.

After the blood is returned to the heart from the lungs, it is ready for the use of the system; to supply the wants, the waste, the exhaustion and the growth of the body. It is sent through the arteries, the large and the small, and in these minute capillaries the work of formation is supposed to be carried on. I say *supposed*, for it is only a theory rendered probable by the certainty of its being done somewhere, and the impossibility of discovering it in the larger vessels, which are subject to the cognizance of the eye: and perhaps the theory is as much supported by the impossibility of denying anything that may be asserted of the capillaries. For if we cannot assert, and still less demonstrate, anything positive of these secret recesses, who can deny anything, and confidently say that this is not done there? Hence, physiologists who broach the doctrine of the formation in these capillaries, may so do without fear of refutation, at least, if not of contradiction. But this is a matter of little consequence, so long as we know the fact, that this blood, which is the same in all the arteries of the body, and nearly the same in all animals whatever, and however various may be the food from which it is originally formed: and this blood is the storehouse for all the different materials of the body, and out of this is formed any part that is wanting; and with unerring certainty, in state of ordinary health, every part has its due supply. In the bone the earthy-lime and the gelatine are deposited to make this rigid part of the frame. In the nerve this substance is created with all the proper nervous, exquisite sensibility to pain and pleasure, and the power of convey-

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ing the will to govern and set in motion the several organs in which it is deposited. In the muscle is deposited a fibrous substance, possessed of power of contraction with great strength, and subject to the control of the will, except the heart and some of the other involuntary muscles, which seem to be endowed with a discretionary power to act of their own accord, without our direction. In other places only fat is wanted to fill out the frame and enable the other organs to act without interruption.

In short, every part and kind of organ, whatever may be its composition or its use and relations, is supplied from this wonderfully versatile operator, the circulatory system, with a precision and faithfulness which would seem almost to indicate a thinking principle in every particle of matter, enabling it to seek out the respective wants of the organs and determine the appropriate relief, and perform such a variety of operations, as nothing but the constant watch of that all-wise Providence who at first created it could carry on without failure or interruption, and without interference one with another.*

After these operations, the peculiar nutritious and vitalizing power of the blood is lost, and it can no longer give life and vigor to the parts of the body: its color is changed from the scarlet to the purple; it contains more carbon. If its course be stopped, as by tying a cord about the arm or finger, or by strangulation, the finger or arm below, or the face above is swollen, and changed to a livid hue; and if this interruption is continued, so that the fresh blood of the arteries is not sent to these parts, nor the venous blood carried off, the part is palsied and dies: for though the amount of blood is not diminished, yet the quality will not allow it to maintain life.

It is now carried through the veins to the heart, and thus completes the circulation of the blood. It then goes again through the lungs, and again through the body; and this continual circulatory process is carried on while life

* Some Atheists, in place of a constant Providence, believe in laws of matter, inherent in all its particles, and adequate to all the changes through which they go. Pursuing this doctrine to its ultimate application, it is resolvable into nothing less than the admission of an intelligent, thinking principle in each particle.

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lasts; the particles constantly changing, and the whole mass, though never identical, is forever the same.

Circulation of the Sap.

'The *proper juice* of plants is *that changed state of the sap after it has been exposed to the air and light in the leaf, and is returning from it to form the different secretions.*'* It is now fitted for the nourishment and the growth of the plant, and is carried to the various parts by a process more simple than the distributing vasculer system of the animal body.

A new set of tubes lead from the sap-cells through the foot-stalk of the leaf to the bark, and through this downward over all the branches, trunk and roots, corresponding to the arteries and the extreme vessels in man.

This bark is the workhouse, in which the formation of the new wood and of the various peculiar principles of the plant takes place. The animal grows by interstitial deposition, by the addition of new particles between those already deposited. Thus the liver grows, not by the addition of layers on the outer surface, but by internal increase; so the finger, or any limb; so every organ, and indeed the whole frame. But the plant grows by the addition of new layers of wood on the outer surface of those already formed. This manner of growth gives the trunk of the pine and other trees, when cut through, the appearance of concentric rings. One of these rings is added annually, and is formed by the inner bark, or rather by the vessels and glands within this organ: for 'the organs by which the secretion is formed are probably glands; and the secreted fluids themselves are deposited in cells in different parts of the plant, particularly in the bark and the roots.'* 'And hence these parts, the bark and roots, receive different properties from the matters which are thus lodged in them.' All the gums, resins, balsams, spices and coloring matters are formed from this proper juice by means of these little organs, which carry on their mysterious opera-

* Nuttall.

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tions like the formation of the parts in the animal body, never to be unveiled to the eye of man.

After having served the purposes of nutrition and growth, and of the secretions, Dr. Darwin thinks the superabundant sap is carried, by means of transverse vessels, which constitute the silver grains, to the ascending vessels in the wood, and there unites with the sap, again to be carried to the leaves and remodified by the air, again to go down through the bark, and thus finish the round of vegetable circulation.

These descriptions of the respiratory apparatus apply to the perfect animals and the trees; but in both races there are exceptions, which are destitute of lungs and leaves. The insects have no lungs; they admit no air into their bodies through their mouths; but they have innumerable little apertures through their skins called *stigmata.* By these they admit air, which comes directly in contact with the blood as it circulates in the vessels. Thus the skin answers the double purpose of protecting the animal from external matter, and purifying the blood.

The leafless plants find a substitute for these organs in the bark, which has its air cells, into which it absorbs the air, and produces the same effect that is ordinarily had in the leaves.

Causes of the Circulation of the Blood.

There is no difficulty of accounting for this in the heart and arteries. Physiologists are agreed that the contraction of the heart is the efficient cause, and the elasticity of the arteries keeps it up through their course. They assume that this power of the heart, or the contractile power of the extreme small vessels, forces the blood through these to the veins; and as these minute organs are beyond our investigation, we cannot deny anything that may be asserted concerning their action. But when the blood reaches the veins, there arises a difficulty. They have given us theory upon theory, till at last they have been driven to the poor and uncertain aid of the muscles, which some consider as the great cause of the venous circulation.

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For who that considers that the blood goes through these vessels just as well in the sleep, when all the muscles are quiescent, as when we are in motion, can believe the irregular and accidental actions of these organs are the permanent causes of the motion of the blood, which must be constant and regular? Let it be, that we know nothing about this, and we shall be in no worse condition respecting these than we are respecting the *circulation of the sap*. To show how far all the philosophical investigations have fallen short of a discovery and satisfactory explanation of this mystery, it is sufficient to state a few of their prominent theories. Some have believed that the sap ascends by the pressure of the atmospheric air on the water in the earth; and others, by the evaporation from the leaves, not thinking that even if the vessels were rigid tubes, this gravitation would force it to only thirty-two feet, and neither of these causes would carry the blood through the leaves or bark. Grew thought it ascended by its specific levity; but the sap is specifically heavier than water. Malpighi supposed it ascended by the contraction and expansion of the air in the air-vessels of the tree; but there are no such air-vessels. Others have attributed this to fermentation—to heat. (This last cause is supported by the great names of Knight and Davy, whose authority ought to command faith in any opinion on this subject. But they only found that the heat was an accessory, not a prime cause. The only effect of heat is expansion, and this expansion will produce motion.) An increase of heat will expand, and hence set any liquid in motion. But this takes place only in changes of temperature; and Mr. Knight found that the sap flowed faster in the spring and autumn, when the weather was variable. But what moves the sap in the summer, or in the hot-house, where the temperature remains the same? Beside, we find that this same agent increases our circulation. If we heat ourselves suddenly, our heart beats quickly: and so also motion, which some think propels the sap when the winds act upon the plants. When we run, the pulse rises; and if we do this in summer, both heat and motion combine, and increase the accidental effect on the circulatory system.

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Capillary attraction does very well, so far as it goes; but when Dr. Hales found that the sap was forced many feet beyond the end of a stump, when it was cut off, capillary attraction could not have been the agent, for it would have attracted down at the upper end of the tubes as strongly as it did up from the lower, and could not have forced the liquid beyond the tubes. It is impossible, says Dr. Thomson,* to account for the motion of the sap in plants by any mechanical principles whatever. 'We must, therefore, ascribe it to some other cause. The vessels themselves must act.' All other causes must be accidental, while this motion is constant, and therefore must have a permanent cause, which must be in the vessels themselves. 'Saussure supposes the sap enters the open mouths of the vessels at the extremety of the roots, and that these mouths then contract, and by that contraction propel the sap upward; that this contraction gradually follows the sap, pushing it from the extremity of the root to the summit of the plant. In the mean time, the mouths are receiving new sap, which in the same manner is pushed upward.' We have stated, in the former part of this treatise, our reasons for believing an active contractile power in plants. We believe this exists in the sap vessels. To every other theory except Dutrochet's there arises some objection which cannot be explained away. To this we know of none; and it is as easy to believe that the vessel contracts upon the top, as that the flowers should open at the approach of the sun, and close at night by means of contraction. We believe this active contraction and relaxation to be a vital power: we do not pretend, however, that when we give it this name we have explained the matter; but we are content to know that it is a power peculiar to living beings, which is similar to nothing out of the living body, and which philosophers cannot understand or explain.

Dutrochet's theory is the last, and perhaps the most satisfactory. He supposes that the sap-vessels are successions of distinct cells, separated by very thin partitions, in which are absorbent mouths. These absorb the sap; the

* Chemistry, Vol. iv. pp. 261, 262.

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one above from the one below it, from the root to the leaf. This absorbing faculty depends on peculiar vital properties, and is in no way connected with any of the mechanical principles which previous physiologists have adopted.

The whole history of physiology shows how prone mankind are to suppose they have acquired the keys to all knowledge, and that they can explain all the phenomena in the natural world, by the few general principles which they have ascertained in dead matter. But every step of this study tells us of the limit to human knowledge which it may never pass. The reason may invent, the imagination may create ways by which nature should perform her hidden operations of life; and we may fancy we understand the whole mystery; but sober truth compels us to confess, that of all these things *we know nothing;* for they are revealed to Him only who created them and keeps them in motion.

Other analogies might be traced between the animal and vegetable races, but time and space forbid; and we fear that we have already exhausted the interest of our readers, whose professions and tastes do not lead them to physiology. Here are enough to show the intimate connection between the two races, and to convince us how universal is the application of some of the laws which many imagine belong to animals alone.

These analogies exist only in the organic functions; in those which go on without the cognizance of the individual, and require not the aid of our will to keep them in operation, and which belong, in common, to all organized beings. In both the general classes these functions differ, not in kind, but in degree. As we ascend from the lowest in the scale of organized beings, these organs and functions become more perfect and more complicated; and other organs and other functions are superadded to them. In this progress, we find one property after another to be given, until we come to sensation and voluntary motion, which are the peculiar, though by no means the universal, characteristics of the animal kingdom.

We find that the perfection of the common organs and functions, and the addition of others is so gradual, advanc-

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ing by such slow steps, that we are at a loss to discover any mark of distinction which we may call the boundary line between the two races. So closely is this connection traceable, that some have supposed that the Almighty Creator, in the beginning, first formed the mineral, then the lowest vegetable, and the perfect of this kind; then the lower animal; and thus by slow and gradual additions and perfection, he went on completing the work, until, at last, he created intellectual man, the highest of all earthly beings. The investigations of the geologists, and the analogies which we have now pointed out, furnish no argument contradictory to this imaginary process. A comprehensive view of the whole of the creation, and a careful study of its order and its harmony, shows nearly the same general outline in all, but variously filled up in the different species, producing a whole almost infinitely diversified, and fundamentally the same.

'Let it not be supposed, that by pointing out such frequent instances of resemblances between animal and vegetable life, I mean to degrade the rank of animal beings from its proper level. I am only tracing, at present, the common principle of vitality to its first outlines. I am endeavoring to unfold to you in its simplest and rudest operations that grand, wonderful and comprehensive system which, though under different modifications, unquestionably controlling both plants and animals, from the first moment it begins to infuse energy into the lifeless clod, draws forth form, beauty and individual being from unshapen matter, and stamps with organization and propensities the common dust we tread upon; and if in this its lowest scale of operation, if under the influence of these its simplest laws and mere powers of contractility and irritability it be capable of producing effects thus striking, thus incomprehensible, what may we not expect when the outline is filled up, and the system rendered complete? What may we not expect when we behold, superadded to the powers of contractility and irritability, the powers of sensation and voluntary motion? What, more especially, when to these are still farther added the ennobling faculties of a rational and intelligent soul, the nice organs of

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articulation and speech, the eloquence of language, the means of interchanging ideas, and of embodying, if I may so express myself, all the phenomena of the mind?' *

AN OPINION OF THE CELEBRATED DE WITT CLINTON.

THE love of fame is the most active principle of our nature. To be honored when living—to be venerated when dead—is the parent source of those writings which have illuminated—of those actions which have benefitted and dazzled mankind. All that poetry has created, that philosophy has discovered, that heroism has performed, may be principally ascribed to this exalted passion. True it is,

> 'When fame's loud trump hath blown its noble blast,
> Though long the sound, the echo sleeps at last;
> And glory, like the phœnix 'midst her fires,
> Exhales her odors, blazes, and expires.'

Yet, as long as man is susceptible of sublime emotions, so long will he commit himself to this master feeling of a noble nature. What would have become of the sublime work of Milton, if he had written for the fifteen pounds which he received from the bookseller; and where would have been the writings of Bacon, if he had not aspired to immortal fame? 'My name and memory,' said this prince of philosophers, in his will, 'I leave to foreign nations and to my own countrymen after some time be passed over.' When with one hand he demolished the philosophy of the schools, and with the other erected a magnificent temple dedicated to truth and genuine knowledge, he was animated in his progress, and cheered in his exertions, by the persuasion that after ages would erect an imperishable monument to his fame.

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* Dr. Good's Book of Nature.

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TELEGRAPHIC LANGUAGE.

[Extract from the Hon. John Pickering's Lecture on Telegraphic Language, delivered before the Boston Marine Society.]

In geography, the name of the island of *Madeira*, for example, is commonly associated only with the wine for which it has been so long celebrated. But it takes its name from the Portuguese word *madeira*, which signifies timber, or wood; and the island was so named by the navigators of that nation, because it abounded in wood. Here, then, a knowledge of the history of the name leads us to an interesting fact in the history of the island itself. In our own immediate neighborhood, too, the name of *Martha's Vineyard* has been sadly corrupted; and upon that corruption has been founded a current story, that it was given by an Indian chief to his daughter Martha, as her portion. We will leave the story to our poets, to embellish their works of imagination; but the simple fact is, as we are informed, that it was so named from Martin Wyngard, an early navigator, and is called in the ancient maps and charts, Martin Wyngard's Land, now shortened to Martha's Vineyard.

Again; in the department of navigation, the familiar exclamation in hailing—'*Ship, a-hoy!*' is said to be derived from the same root, and is substantially the same word, with the ancient exclamation used at the tilts and tournaments of the knights—*Ho!* in French, *Ho-la!* that is, Stop. The nautical phrase, then, of Ship, a-hoy, means simply, Ship, stop. And this same expression, among landsmen, is applied to vehicles moving on land by means of horses and other animals; but is then changed into the well known exclamation, *wo!* that is, stop or stand still.*

I gave (at a recent lecture) a very brief account of the number of languages on the globe; and I observed that, including the different dialects and plainly-marked shades of speech, it was estimated many years ago, that there are in Europe 587 languages; in Asia 987; in Africa 276;

* Pegge's Anecdotes of the English Language.

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and in America 1214; making in the whole, 3064 languages and dialects. Great as this number appears, it is doubtless below the truth; as a recent author, who has given a more perfect enumeration and estimate, makes the astonishing aggregate of 5860. But you will receive these as approximations only to the truth. If we consider the great variety of languages still to be discovered in the interior of Asia, Africa, and America, we cannot estimate the whole number, probably, at less than 4000.

Now all this body of languages is divided into two general classes, *written* and *unwritten*. The latter division comprehends the various dialects of the savage or uncivilized tribes, who have never had the use of letters; and who, therefore, communicate their ideas by sounds, or through the medium of the ear. Under the head of written languages are included those, in which ideas are communicated by characters or signs addressed to the eye; whether such signs are made by a pen, or by types, or a painter's brush, or a flag, or a telegraphic signal, or any other visible object.

These two classes of signs, the written and the unwritten, appear to have no natural connection with each other; a circumstance which at first seems strange to us. But we have only to call to our recollection a fact which we daily witness, in order to satisfy us of its truth; that is, that we constantly meet with illiterate persons, who can speak very well, without knowing a letter of the alphabet; and, on the other hand, we have the deaf and dumb, who have a perfect use of written words without knowing any thing of the spoken language.

The kinds of signs, or characters, are almost as various as the nations who use any written language.

The ancient Egyptians used the pictures of animals or other objects; which were formerly supposed to be mysterious and wholly symbolical, but are now understood to be alphabetic characters; the explanation of which would not be without interest, if this occasion were a proper one for the discussion. On the *Babylonian bricks*, (of which we have a specimen in our Athenæum,) a kind of character was used which resembled the barbed head of an ar-

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row; and they are thence called arrow-headed letters. In America, the Mexicans had a species of picture-writing, of which, unfortunately, we know but little at the present day. The Peruvians adopted a species of notation, which is classed under the head of written languages, because it was addressed to the eye, and not to the ear. I mean their knotted cords, or strings of different colors, known by the name of *quipos;* by which they kept an account of their revenues, population, and other matters in statistics and political economy. These knots were intended as remembrancers of events, dates, numbers, &c.; and some of you may perhaps be surprised, when you are reminded of a similar practice even among ourselves, though in a very limited degree; for what is the tying of a knot in the corner of one's handkerchief, by way of remembrance, but a Peruvian *quipo,* or knotted string? It is true that we do it for a temporary purpose; but it is in substance the same thing. It is a mark, sign, or visible character, by which we assist our memory.

On the same principle the natives of America near our borders, besides the occasional use of a species of picture writing cut or painted on the bark of trees or the skins of buffaloes, keep their records or memorials of important transactions by means of belts of *wampum;* a name, which is from the native word *wampi* or *wompi,* signifying *white,* that being a conspicuous color in them.

I have given you this very brief outline of the subject of written language, or signs addressed to the eye, in order to draw your attention to the curious fact of the great diversity of signs and modes adopted by our fellow men on different parts of the globe, to hold communication with each other.

Of all these ingenious inventions, however, none exceeds in simplicity, and none equals in rapidity, the *telegraphic system,*—one of the greatest improvements of modern times.

Every one of us hears and reads of news by the Telegraph, from day to day, without ever considering, much less understanding, anything of the principles of this mode of communicating intelligence. On account of its incal-

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culable importance to the mercantile interest, and, above all, to the lives and safety of our seafaring brethren, as well as for the simplicity and efficiency of the modern Telegraphic system, I have thought it would be interesting to most persons, to have some general knowledge at least, of the construction and use of the Telegraph in its present highly improved state.

The word *Telegraph* is derived from two Greek words, *teele*, at a distance, and *grapho*, to write, or indicate by signs; as *telescope* is derived in the same manner from the Greek words *teele*, at a distance, *scopeo*, to see. Another name is also used, which is likewise taken from the Greek —*Semaphore*, from *seema*, a sign, and *phero*, to bear, or carry.

It must be evident to the most common observer, that no means of conveying intelligence can ever be devised, that shall exceed, or even equal the rapidity of the Telegraph; for, with the exception of the scarcely perceptible delay at each station, which is necessary in repeating a communication, its rapidity may be compared to that of light itself. The Telegraphic Science is yet in its infancy in this country; and it is a subject of no little surprise, how few persons among us have turned their attention to it.

A perfect Telegraphic system should be sufficient to communicate, by combinations of signs, all that could be communicated by writing; but every plan hitherto devised has been liable to some objection. Signals of different kinds have been employed from the earliest periods of society; they were sometimes addressed to the eye and sometimes to the ear.

The Telegraphic art, properly so called, was not unknown to the nations of antiquity. It is often traced back to the siege of Troy, the fall of which city is said to have been made known in Greece by Fire-signals. The Greeks certainly had invented a method of expressing, by the number and arrangement of torches, every letter of their alphabet; so that a guard on one eminence could converse with another, at a distance, by spelling his words. You will find a full and curious description of the Greek

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methods in Polybius's History. And it is both curious and instructive to see his reflections upon the imperfect plans adopted in earlier ages, and the high state of perfection to which he considered the system to have been brought in his own time. He makes the comparison in much the same language that we should now use in contrasting the improvements of our day with those of his, and that posterity will, perhaps, apply to ours. 'In former times,' says he, 'the manner of communicating was too simple; and the invention, upon that account, lost much of its advantages. . . . Æneas, who composed a work on the Art of War, perceiving the defects of this method, added, indeed, some little improvement to this invention; but was very far from carrying it to that degree of perfection which the thing requires.' He then gives a minute account of this invention; and afterwards introduces an explanation of his own improvement upon the former methods in these words:—'The last method which I shall mention was invented either by Cleoxenus or Democlitus, but perfected by myself. This method is precise, and capable of signifying everything that happens with the greatest accuracy. A very exact attention, however, is required in using it.'*

In more modern times, besides fires, objects elevated in the air, smoke, sky-rockets, and discharges of cannon have been employed. But all these modes are very imperfect, as well as too expensive and troublesome.

The Marquis of Worcester, who has justly acquired so great celebrity by his discoveries relating to the power of steam and its application to the mechanic arts, contrived a species of telegraph of considerable merit. Several other individuals also devised different systems of signals. The first idea, however, of a telegraph upon a plan similar to those now used, was suggested by Dr. Hooke, who constructed one during the siege of Vienna by the Turks, in 1683; and his plan was quite as ingenious, though not so

* The method described by Polybius is often alluded to by writers on this subject, but is not generally given with sufficient minuteness to make it intelligible. I have therefore thought it might be interesting to most readers to see it at large; a translation of it will accordingly be found in a note at the end of this lecture.

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useful, as those which are now adopted in Europe. A description of it was communicated to the Royal Society of London in 1684. He had an apparatus of characters to denote the letters of the alphabet; and, if employed by night, he used lights disposed in a certain order, which were covered and uncovered, according to a plan agreed upon. But his invention was not carried into effect until nearly a century afterwards;—though an attempt was made in France by M. Amontons, a French academician, who died in 1705, to introduce a method which appears to have been exactly the same with that of Dr. Hooke. A considerable time after that, other plans were proposed by Guyot and Paulian, in France; and so long ago as the year 1767, in Ireland, Mr. Richard Lovell Edgeworth made an experiment of the kind with signals made by the different positions of the arms of a common windmill, the sails being removed from one or more of the arms, as each signal required. These signals denoted numerals; and the persons at both stations were provided with vocabularies, in which all the words were numbered.*

The ancients used the letters of the alphabet; but later experience has substituted the arithmetical figures, agreeably to a Dictionary of Numerals of great extent and comprehensiveness; and this system can be easily applied to commercial, political, or other purposes.

During the French Revolution, which was so prolific in everything that tended to develope the resources of the human mind, a Report, made to the National Convention, or government of France, ascribes the invention of the modern telegraph to Mons. Chappe. His machine consisted of an upright post, with a bar of wood, or balance-beam eleven or twelve feet long, moving on its centre across the top like a scale-beam, and having at each extremity shorter bars, called indicators, which likewise turned upon their respective centres; all the requisite combinations could be made by placing the large and the two smaller bars either horizontally, vertically, or at different angles with the horizon. But the use of it was complicated.

* Transactions of the Royal Society in Ireland, Vol. vi. p. 125.

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In the year 1793, Lord George Murray, in England, invented the *six shutter Telegraph*, or six square boards turned by pulleys connected with cranks below, in such a manner that either the whole surface or the edges of them might be exhibited to the eye according to the required signals. This was constructed upon the principle of representing letters of the alphabet, or the *lettering plan*, as it is called.

In 1816, Sir Home Popham, of the British Navy, invented what he called the Semaphore Telegraph, which was immediately adopted by the English Board of Admiralty, and continues in use to the present time. It consists of an upright post, or mast, with two arms moving vertically on their respective centres, one at the top of the mast, and the other half way down; each arm being made to perform an entire revolution, and being turned with facility and despatch, so as to take any position that may be required; differing, however, from each other in principle of motion, degrees of power, and mechanical contrivance. These signals express either letters or numerals, according to the system previously agreed upon.

[TO BE CONTINUED.]

THE BUFFALO.

THE young of our buffalo, or bison, have been repeatedly put among the tame cattle at Quebec, and after exhibiting, on all occasions, symptoms of their original wildness, have commonly died in a few years. It is supposed that the climate is there too cold for them. This difficulty cannot exist here. Before the cultivation of the country they were in immense herds in the western parts of the state of New York, frequenting the salt licks, and roving over the wide-spreading, luxuriant prairies of the Genessee, and they have given their name to a celebrated stream which runs into Lake Erie near its outlet. It has been domesticated in South Carolina, but appears to retain some of its primitive wildness.

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CURIOUS ANECDOTE OF A TOAD.

In the first place, we thank the author of the following communication for the article, but at the same time assure him that he or the observer must have been deceived. We have an indistinct recollection of reading a similar account in some of the old books of natural history, and really supposed, for a time, that this was only a new presentation of the old story; but having abandoned that notion, we give it to our readers as it was received,—desiring at the same time, that any other facts, of a similar character, may be transmitted by our distant friends.

[Furnished for the Tracts and Lyceum.]

Observing a notice in the Tracts and Lyceum for January, 1834, of an attack of a spider upon a young rat, I would notice a circumstance which took place a few years since, as it serves to show the sagacity as well as the medical skill of the reptile tribe.—A toad was observed to be engaged in battle with a large spider, which remained stationary while the toad would make a pass at him and snap with its jaws in the same manner in which they are observed to do when taking small insects for food; and when making those passes, the spider would ward off the blow and occasionally bite the toad. The toad, on receiving the wound, would hop off a short distance where there was a plant growing which is usually known by the name of *plantain*, and would nibble the leaves apparently to apply an antidote for the poison received from the fangs of the spider, and then return to battle again. This being near by a work-shop, several persons were attracted to the spot. After this process had been carried on for some time by the toad, that is, alternately fighting the spider and biting the plantain leaf, one of the gentlemen very cautiously, while the toad was thus disputing the field, pulled up the plantain-leaf and took it away. The toad was again wounded, and straightway proceeded to his old physician; but on arriving at the spot, discovered the loss of his antidote; and if ever dismay was exhibited in a reptile, it was now to be seen. The toad, for a few moments, hopped one way and another with all his powers in search

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of another plantain, but found none; and immediately the poison from the spider took effect; and he kept in search of a remedy, but his hops were weaker and weaker, and in a very few minutes he expired. I. G.

Dunstable, (N. H.) Jan. 9, 1834.

GOVERNOR HUNTER.

SWIFT's Discourse on the Mechanical Operation of the Spirit was supposed to be addressed to Governor Hunter. In the fifteenth volume of Swift's Works there are two letters from the Dean to him. In the first epistle Swift says:—'Sometimes Mr. Addison and I steal to a pint of bad wine, and wish for no third person but you; who, if you were with us, would never be satisfied without three more.' In the second letter he says, 'I am very much obliged to you for the favor of a kind reproach you sent me in a letter to Mr. Addison, which he never told me of till this day, and that accidentally; but I am glad at the same time that I did not deserve it, having sent you a long letter in return to that you was pleased to honor me with, and it is a pity it should be lost; for, as I remember, it was full of the *diei fabulas*, and such particularities as usually do not find place in newspapers.' These quotations indicate the great intimacy between Hunter and those distinguished men.

The same volume contains two letters from Hunter to Swift, dated New York, 1st and 14th of March, 1712-13, both breathing great discontent and uneasiness with his situation. In the last he says, 'Here is the finest air to live upon in the universe, and, if our trees and birds could speak and our assemblymen be silent, the finest conversation too. *Fert omnia tellus;* but not for me; for you must understand, according to the custom of our country, the sachems are of the poorest of the people. I have got the wrong side of Sir Polidore's office; a great deal to do, and nothing to receive. In a word, and to be serious at last, I

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have spent three years of life in such torment and vexation that nothing in life can ever make amends for it.'

Hunter was afterwards appointed Governor and Captain General of Jamaica, in the room of the Duke of Portland, who died there in 1726.

A COMPLIMENT FROM MR. PITT.

The statesmen who appeared at the dawn of the revolution attracted the admiration of Europe; and the masterly state papers which our state convention and the general congress promulgated, breathed the genius of Greece, and the invincible spirit of Rome, and covered with glory the American name. 'When,' said the elder Pitt, 'when your Lordships look at the papers transmitted us from America—when you consider their decency, firmness and wisdom, you cannot but respect their cause, and wish to make it your own. For myself, I must declare and avow that in all my reading and observation—and it has been my favorite study—(I have read Thucidydes, and have studied and admired the master states of the world,) that, for solidity of reasoning, force of sagacity, and wisdom of conclusion, under such a complication of difficult circumstances, no nation or body of men can stand in preference to the general congress at Philadelphia.'

FOSSIL SHELLS.

The fossil shells and petrifactions which have been discovered all over the world, on the loftiest mountains as well as in the bowels of the earth, are justly considered as the most interesting phenomena of nature. Linnæus says that 'the innumerable petrifactions of foreign animals, and of animals never seen by any mortal in our day, which often lie hid among stones under the most lofty mountains,

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are the only *remaining fragments of the ancient world.*' Buffon denominates them the *monuments*, and Pallas styles them the *medals, of nature.* Dr. Barton has expressed this idea in the following impressive language:—'I consider the petrifactions and impressions which are found on many of our mountains, as some of the most interesting medals of the revolutions which our country has undergone.'

FIRST NOTICE OF THE BONES OF THE MASTODON.

In the year 1748, M. Fabri, who had made great excursions into the northern parts of Louisiana and the southern regions of Canada, informed Buffon that he had seen heads and skeletons of an enormous quadruped, called by the savages the father of oxen; and that the thigh-bones of these animals were from five to six feet in length.

In Siberia a similar animal was supposed to exist under ground, and many fables were related respecting it under the Russian name of mammoth. Notwithstanding these traditions and reports, the attention of the philosophers of Europe was not fully drawn to this subject until 1765, when Mr. George Croghan saw, in the vicinity of a large salt marsh, on the country bordering on the Ohio, immense bones and teeth, and he sent some of them to England, where they immediately became the subject of speculation and discussion. Before this similar bones were discovered in the Russian dominions.

FIRST BOTANIC GARDEN IN THE UNITED STATES.

The first institution in the United States established as a repository of the native vegetable productions of this country, and for the purpose of naturalizing such foreign plants as are distinguished by their utility either in medicine, agriculture, or the arts, was the Elgin Botanic Gar-

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den, founded in 1801, by Dr. David Hosack, at that time Professor of Botany and Materia Medica in Columbia College. This establishment is situated about three miles from the city of New York, on the middle road between Bloomingdale and Kingsbridge. The ground, consisting of about twenty acres, was originally purchased of the corporation of this city. The view from the most elevated part is variegated and extensive, and the soil itself of that diversified nature as to be particularly adapted to the cultivation of a great variety of vegetable productions.

[Furnished for the Tracts and Lyceum.]

THE Form of a Memorial to Congress, which is proposed to Printers, Publishers and Booksellers, and all others interested in the cheap and regular transmission of Periodicals, Pamphlets and Books.

To the Honorable, the Senate, and House of Representatives of the United States in Congress assembled.

The undersigned, inhabitants of in the county of and state of would respectfully represent, that the interest of the Union would be greatly promoted by the establishment of regular lines of communication over the country for the conveyance of packages, as of periodicals and books. Many works are now published in series, which are circulated extensively through the states; but from the nature of their contents, they are not required to be transmitted by the rapid conveyance of the mail, and besides, the expense of this mode of conveyance forbids such transmission. But the law of Congress of March, 1827, respecting the Post Office, enacts 'That no person, other than the Post Master General, or his authorised agents, shall set up any foot or horse post, for the conveyance of letters and packets, upon any post road, which is, or may be established as such by law.'

The Post Office law, therefore, while it thus forbids the establishment of a regular system of conveying at moderate

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speed, and at a small expense, books, pamphlets and periodicals, provides no such system. The public good, therefore, requires that the law be altered so that there may be established any means for the regular conveyance of packets of any description, excepting letters or written notes.

Thus the printers, publishers and sellers of pamphlets, periodicals and books in general, will have an equal opportunity with other men, to pursue their business; and the remoter parts of the country will be benefitted by having easy access to valuable works printed in a distant city of the Union. As intercourse between different quarters will be thus increased, so will the business and income of the Post Office by letters be increased. And as the very rapid transmission of newspapers is generally desired, these will go, as they now do, by mail, except where they are of a scientific character merely, and the patronage of the Post Office will not therefore, be diminished.

Your Memorialists therefore pray for a repeal of that part of the Post Office law, which enacts that no foot or horse post, shall be set up for the conveyance of packets.

And as in duty bound will ever pray. F. F.

ORIGINAL MISCELLANY.

Scientific Doings.—Since our last, nothing particularly interesting has been noticed in the transactions of the learned societies of this vicinity. Dr. Harris's lecture before the Natural History Society, on Tuesday, Jan. 21, as might be expected, was a critical entomological inquiry. In that part of his lecture which treated of the eggs of insects he was certainly very happy. Till then, we were not aware of the curious fact, that cockroaches displayed so much skill in providing for the preservation of their young. It seems that twenty-four eggs are arranged in three rows, one above the other, and then carefully boxed up in a fabric, which the female constructs, that has an opening at one end, over which are two

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valves, or doors, like those, for instance, of a dog-kennel. These shut themselves, so that as fast as the young cockroaches are hatched, they make their exit at the door, which closes upon those within. This contrivance is manifestly with reference to the security of those left behind, as they are not all extruded from the egg at the same time. Other examples were given, quite as marvellous, showing, to a demonstration, the workings of a something that borders so much upon intelligence, that the metaphysician must certainly find it a difficult undertaking to give the why or the wherefore.

Dr. Harris, it must be acknowledged, is completely at home with the insect creation. He seems not only familiar with the names of all creeping things, but tells us where they dwell, what they do, and why they were created.—Dr. Gould is another man whom we always listen to with deep interest on entomology. If these gentlemen are spared to the common age of man, their labors—being both indefatigable workers—will redound to the honor of the country which gave them birth. We can hear original things with pleasure and patience, but above all things, detest the stale, ten thousand times quoted *facts*, *ideas* and *language*, which is the distinguishing feature of very many public lecturers. Drs. Gould and Harris belong to the class of investigators which we respect, because they select their facts from the broad field. On the whole, it is to be regretted that the Society's course of lectures could not be continued till April.

Phrenology.—Since the death of the much lamented Spurzheim, we have heard very little about practical Phrenology. Societies, soon after his decease, sprung up with mushroom rapidity, and hosts of inquirers rushed into the arena, with a strong determination to peep into the matter themselves, and positively ascertain whether there was any foundation in nature, on which a new science could be erected. In reality, there was great cry and little wool. Men who knew no more of the structure of the animal body than they did of the organization of the planet Herschel—nor any more of the laws of mind than of the Chinese penal code, touching the whipping of Mandarins, were the savans who took bold positions with reference to declaring for or against Phrenology. Now what has been the result of such spirited doings? Societies, it is true, here and there, have a nominal existence,—but we have never

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heard of one single transaction that claims the attention of the lookers-on,—by which we mean the world.

Instead of profound research,—the burden of the whole story seems to be, now-a-days,—Dr. Gall says thus, Spurzheim thus, and Mr. Coomb something else. Pray, good gentlemen, is this examening into the truth or falsity of the doctrines of Phrenology?

For ourselves, we are firm believers in the doctrines of Phrenology:—we cannot resist the weight of testimony which we heard from the lips of the immortal Spurzheim. Indeed, when we say anything tremendously loud, by way of convincing a doubter of the truth of any declaration, we invariably cap the climax by saying,—Sir, it is as true as *Phrenology*, which is considered the *ne plus ultra* of all argument.

In this good city, there exists a Phrenological Society, and whenever they publish their transactions, we indulge the hope that some good friend will gratify us with the volume.

If there were more literary Jackalls in the United States, to run with the bones which the lions leave ungnawed, a high degree of interest would be given to the periodicals of the day, and all the principal societies, whose objects are scientific, would be excited to a far greater degree of energy than that which now distinguishes them. In a word,—reporters are what are actually wanted, to give character to many literary associations. Were it a condition of the charters of such institutions that their doings should be published immediately after each meeting, the whole community would be intensely interested in their prosperity,—would honor and sustain them,—and they would flourish like the '*green bay tree*.'

INGENUITY OF A SPIDER.—A large blue fly having got his legs entangled in a web, set up a terrible buzzing with its wings, but could not extricate its pinioned members. A little spider stood watching the prisoner at a distance of two inches, on a slender thread of its own weaving. As soon as the poor fly had become weary, so that its wings were still, the little assassin crept so near, that with its right hand it fastened a line on one wing, and then scampered off to the wall to make it fast. The fly, thus alarmed, again began to buz as furiously as before; but the spider never ventured near till the wings were quiet, when it cautiously crept near enough again to throw a second cord over the wing, which was fastened, as in the first instance, to the ceiling. Thus, by little and

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little, and patiently waiting for opportunities, both wings were completely bound down with those almost invisible lines. Being conscious that the fly was now completely within its power, the cruel spider boldly seized upon the body of its captive, to feed leisurely upon its vitals; but a spectator, overcome by his sympathies for the wretched insect, crushed the spider into an impalpable powder. He now attempted the liberation of the fly; in doing which he not only tore off several of its legs, but so injured the membrane of the wings as to render a repair impossible. His compassion obliged him to kill the poor fly also; and the gentleman walked away in a very unhappy frame of mind, declaring that he did not believe—'Whatever is, is right.'

Notices of New Books.—Like a prudent physician, we never prescribe without seeing the patient:—the editor cannot examine the pulse, *a la turque*, through the folds of a cashmere shawl. If authors desire a notice of their works, and particularly a favorable one, they must forward us copies of them, to the care of Allen & Ticknor. The extensive circulation of this periodical over the whole United States, certainly promises to radiate that kind of intelligence which is most profitable to an author; but unless the book to *be praised* is before us,—what can we say? One thing is certain; mistakes might be made—wrong notions might be entertained, and something positively disrespectful and injurious to the sale, might be sent abroad,—and all for the want of a copy.

Two little volumes have been received the last week, about which we intend to speak decidedly favorably; not because the books are worth a sixpense, but to show the compilers that such an act of courtesy in remembering us, after having supplied every body else, from Dan to Beersheba, demands our profound acknowledgments. O! *that mine enemy would write a book*, exclaimed the afflicted *Job*. It is shrewdly supposed by some expositors, that we are to understand that he only desired a chance to review it—to get a hearty revenge. When our semi-monthly reviews of new publications commence, kindness will be shown to those, who kindness show to us.

Hearts of Oysters.—Every oyster that is swallowed, as it is taken from the shell, has a heart pulsating about thirty-seven times a minute.

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Ancient Grave Stone.—From the Rev. Josiah Brewer, now a resident of Smyrna, the editor, some time since, was presented with a marble tomb-stone, about two feet and a half high, fifteen inches wide, and four in thickness, which was dug out of the ground in the classic Island of Poros, in the Grecian Archipelago, and which, without the least shadow of doubt, was made long before the commencement of the Christian era. This we infer from two considerations, viz: in the first place, the execution of the bass-relief on the pediment, shows that the art of sculpture was then in the meridian of its splendor; and secondly, the wretched descendants of those refined people who raised such beautifully wrought mementos of affection to their departed friends, have never exhibited any taste for, or knowledge of, the fine arts.

The figures are these: a woman, in a stooping posture, is reaching a bowl to the other, which represents the dead body of a man; probably her husband.

Perhaps an engraving of it may be made—in which case those who love antiquarian researches, will have a *rare opportunity* of gratifying their curiosity.

Infant Schools.—Having reflected carefully upon the subject of infant schools,—and, withal, believing that children, at the tender age when they are considered proper subjects for primary instruction, should be listening to lullaby in their mother's arms, has determined us to probe this ulcer on the body of education,—an unphilosophical system,—so fashionable, that it already threatens the extermination of the rising generation of little children with a dropsy of the brain. Any communications upon this subject, however at variance with the received opinions of the day, will certainly lead, in the sequel, to that kind of investigation into the abuses of infant schooling, which is obviously demanded by the public.

Exotic Serpents.—We do not recollect of reading in any of the works on natural history that serpents of tropical regions, when brought to northern latitudes, shed their skins four times a year. Perhaps the same desquamating process goes on in their own native lands; and if so, it is certainly still more curious that a change of climate should produce no modification of the law. We saw a tole-

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rably stout anaconda, about twelve feet long, in the very act of turning his skin off. The serpent, after the skin became loose round the lips, thrust his head through the cable-like coils of his own body, and thus threw it off, inside out, like a stocking turned from the foot. The keeper informed us that this serpent, as well as all the boas, regularly cast its skin once in three months. Our native species only shed theirs annually. How is this to be explained? We should like an answer from some correspondent.

Difference between an Alligator and a Crocodile.—The *true crocodile* is found in the river Nile, but by no means in such plenty as in the times of the Pharaohs. The species which was domesticated by the priests, and magnificently provided for in a temple in Memphis, was of a green color. It was an object of profound worship, called a god, and embalmed when it died.—On the other hand, the *alligator* is exclusively found in America; and instead of having an uninterrupted series of teeth round both jaws, as in the crocodile, the fourth tooth of the under jaw shuts into a corresponding socket in the upper one. This law is so universal, that any person, by remembering this fact, may with certainty designate the one from the other.

A New Hydrometer.—Take a tube, about an inch and a half in diameter, one foot long, and fill it half full of water. Next, into the tube put a common frog, hind feet first. In dry weather, the reptile will try to cover itself by settling down into the water, but at best, can be only partially submersed. If rainy weather is indicated, then the frog rises in the tube, by straightening the hind legs against the bottom, in order to expose the surface of its body to the moist atmosphere. As frogs never drink, but absorb water through their skins, it explains the rationale of the process. By a little observation, a very accurate prognostication of the weather may be formed, during six months of the year.

Vocal Organs of Birds.—In man, and most of the warm-blooded animals, the larynx, or vocal box, forms a protuberance in the front of the throat; but in birds, the same organ is placed at the bottom of the neck, instead of the top.

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Optical Apparatus.—Much difficulty has been experienced by teachers in conveying to the minds of pupils, an idea of the course of light in passing through the various lenses and media of different degrees of density. A new species of apparatus, illustrative of the science of optics, will soon be exhibited to the public, by which the beautiful, yet intricate science of optics will be more readily understood by children, than it has formerly been by thousands who supposed themselves initiated, at least, into the first principles of the laws of light.

Public Lectures.—Since our last number was issued, many highly valuable lectures have been given at the Athenæum, Temple, Boylston and Chauncy Halls, &c.; but it has been found impossible to concentrate the essence of them all in the little space allotted to such notices in this journal. In point of practical importance, however, those on Civil Engineering, by Lieut. Roswell Park, have the first rank, for the past week.

Frogs.—Before the common frog becomes perfectly developed, it is four years old.—Three years are required for the common white grub-worm, found in the deep soil of a garden, to pass through the requisite changes to become a perfect insect.

How to begin the Study of Phrenology.—Every time you discover the dry skull of an animal bleaching in the field or by the way-side, save it; and before two years have gone their rounds, a collection of heads would be thus brought together, that would have interested Dr. Spurzhiem himself. Dr. Gall, the celebrated discoverer of this science, in his boyhood, had congregated such an astonishing number of craniums, from the insect to the elephant, that he would have been greatly distinguished in the catalogue of industrious savans, had he never done anything else.

It is not from a man's head alone, that this curious study can be prosecuted. The heads of reptiles, birds, and the whole range of the wild and domestic animals are necessary to constitute a cabinet, illustrative of the organization of the brain in our own species.

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We will venture to predict, that any of our young friends in the country, whose opportunities are vastly superior to those of the city, will sell to the lovers and believers, and perhaps to the unbelievers, too, all the heads they can collect—long before they have a thousand on hand—for a sum that would be considered a very ample compensation for the labor.

Were a few specimens, neatly bleached in the sun, having been macerated occasionally in cold water, till they were completely white, sent to our office, it is possible a market might be found among the curious of this metropolis, worth the experiment.

To CORRESPONDENTS.—A. B. C. mistakes the object: we go upon the presumption that all our readers have learned the alphabet. Common sense is an invaluable treasure, and is to a writer what ballast is to a ship—it keeps them both from capsizing.

S. J. is strangely operated upon by a centrifugal force, that shoots him beyond the mark.

CHARON—we know by his style, still tends a ferry-boat.

X. L. is worth having. We prefer having one new coat to two old ones. Original matter is our constant desire; we are like the SPEACHLESS Irishman, whose cry WAS WATER, WATER, WATER.

SOPHOCLES writes well: he would confer a favor by giving double doses, because his communications are really palatable.

S. S. R. understands the subject well. As soon as possible, he shall have a page.

A QUERIST is unnecessarily in doubt. His knowledge is profound, and every line that follows his pen is so well constructed, that no one but the author himself would dare find fault.

A PATRON IN OHIO is indeed obliging: we not only sincerely thank him for his valuable papers, but beg that he will accept a standing invitation to dine, the first day he arrives in town.

A finely and scientifically written essay on India Rubber, and its introduction into the arts, which promises such beneficial results to mankind, must be welcome everywhere, and will therefore appear in our next number.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

FEBRUARY 15, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

CAOUTCHOUC.

It is with peculiar satisfaction that we present our readers with the following valuable essay on the useful purposes to which India Rubber may be applied, in domestic economy. In fact, it must be regarded as a new era in manufacturing, when an article, so common as *Gum Elastic*, after having been considered only in the light of a simple curiosity, of no sort of value in the arts, for upwards of one hundred years, all at once becomes one of the most important articles in the vegetable kingdom. We will not pretend to enumerate the thousand forms it may readily be made to assume, to be actually worth more than its weight in gold,—but simply direct the reader to our correspondent's own observations.

Every steamboat, packet, ship and vessel, throughout the United States, should be supplied with beds, life buoys, and other life-preserving apparatus of India Rubber. The benefits accruing to this country, alone, by the happy discovery of the practicability of moulding this remarkably elastic substance into so many indispensable forms—all of which have a direct and positive influence on the every-day comfort, safety and convenience, of every person who travels by water—are indeed incalculable. But, separately from the great advantages accruing to the community, from this species of manufacture, we are proud that the genius of New England has the honor of first discovering, not only a solvent for the rubber, but the process of drying it again, which has been a desideratum with the chemists of Europe since its first introduction from South America. Well knowing we can give no new interest or value to the following pages, by any comments of our own, we barely

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refer the reader once more to the article itself, with the assurance, that in point of importance, the discovery of the process by which INDIA RUBBER has been made subservient to the wants and necessities of mankind, is an extraordinary event in the history of the arts.—EDITOR.

THIS article, which has been known to the public by the familiar name of India Rubber, is a white milky juice or gum exuded from certain plants, found abundantly in Para, in the Brazils, in Quito, in Asia and several other places; they grow so extensively in some places that hundreds of miles are covered with them: therefore there is no fear of the material falling short of the demand. The first knowledge of it in Europe was acquired from some French academicians, who were sent out for astronomical observations in 1735; yet its useful properties were unknown, until within ten or fifteen years. So late as the year 1770, Dr. Priestly, in a note appended to the preface of his 'Familiar Introduction to the Theory and Practice of Perspective,' remarks: 'Since this work was printed off, I have seen a substance excellently adapted to the purpose of wiping from paper the marks of a black lead pencil. It must, therefore, be of singular use to those who practice drawing. It is sold by Mr. Nairne, mathematical instrument maker, opposite the Royal Exchange. He sells a cubical piece of about an inch, for three shillings; and says it will last several years.'

The Caoutchouc has great elasticity, and possesses the peculiar property of being impervious to air and water; and can be applied to many valuable uses. Since this discovery, many experiments, at a great expense, have been made in England; and its value is highly appreciated.

As it regards this country, we well remember when, in our childhood, we first became acquainted with the little leathern bottles, for such they seemed to be, from the form in which it was imported. These little flasks of gum were made by the natives in this shape, by making a mould of clay and then permitting the juice to run over its surface till there was a thin layer or coat; in this state it was held over a fire to dry, and hence its black color from the smoke. When dried it was covered with another coat of the

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juice, which was also dried, and so on till sufficient thickness was obtained. The clay was then removed from the inside, by breaking it into fine powder, and ejecting it from the neck of the bottle. After the commerce of the United States became more extended with the southern Continent, it came to us in the shape of children's toys, balls, and over-shoes. It being known that its original condition was the fluid state, attempts were made to liquify it, for the purpose of applying it to other uses: solvents were discovered, such as the essential oil of coal tar, the oil of sassafras, and the essential oil of turpentine: it was found to be soluble in fat oils, as of almonds and olives. After this was known, it was applied to cloth, canvass, and boots, for protection against the weather. These attempts were, however, but partially successful; for it was found that the solvent deprived it, in part, of its tenacity to adhere; and, instead of a firm but yielding tension, it converted it into a glutinous matter, whose adhesive properties were weakened on the application of moderate heat, or even by exposure to common air in warm weather. This rendered it inconvenient and useless for many purposes to which it was desirable to apply it; and it was not till the establishment of the India Rubber Company at Roxbury, in this state, an association of gentlemen who have ample means to carry their plans into operation, that a mode was found out, through the intervention of expensive machinery, of reducing this peculiar substance from the state in which it is imported, to a liquid, and again restoring it, after it has been applied to the purposes required, to its original tenseness and elasticity, without impairing any of the original qualities for which it is distinguished. Cloth may be covered by this new process, and present a smooth and pliable surface, to which it adheres with all its original tenacity; so much so, that seams of garments, or pieces of cloth united together with it, cannot be separated; and even the material itself, which is subjected to the application, seems to acquire additional strength and durability. The same effect is produced on other substances; and the *modus operandi* by which this result is procured, seems to have been completely successful.

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The purposes to which the *Caoutchouc* can be advantageously applied, are numerous, and have opened a new field for industry and enterprise. A flexible substance capable of confining atmospheric air, and of sufficient strength to sustain an external pressure of more than six atmospheres, as this has been proved to be by actual experiment, is a desideratum in the arts, which science in the various phases of its progress had not invented, nor philosophy, till now, obtained from the prolific materials which nature has supplied for the experiments of her inexhausted laboratory. Manufactured leather has heretofore supplied, to some extent, the want of such material; but it is surpassed by India Rubber cloth in flexibility, strength, and its capacity to retain air and fluids. Experiments have been made with the fire-engine hose, usually made of the firmest leather; and the hydraulic pressure which burst the leathern hose in pieces, it sustained without any appearance of its parts being disunited.

From these general remarks on *Caoutchouc*, and its application to cloth, we proceed to enumerate some of the specific purposes for which it has been used; without mentioning wearing apparel, over-shoes and boots, by which we are furnished with complete protection from the severity of our northern clime, a panoply which Boreas cannot pierce with his searching blast, or penetrate with his pelting storms. The first on the list of useful improvements, is the

Seamen's Bed, or Floating Mattrass,

Invented by Mr. Israel Martin. The object of the inventor was, to furnish an article which might be used for the preservation of human life, when disasters happen at sea, or on rivers. For this purpose this mattrass is well calculated. It is simple in its construction, being made like the common mattrass, and enclosed in a covering of India Rubber cloth. As the seams of the mattrass are closed with *Caoutchouc*, a portion of atmospheric air is enclosed with the material which is used to fill it. As this air cannot escape from its 'prison house,' and must remain there as long as its covering continues whole, it adds to the buoyancy of

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the mattrass, in proportion as the specific gravity of air is less than that of water, keeping in view the quantity of air thus enclosed. Air is said to be 900 times lighter than water; consequently, a single cubic foot of air inclosed in one of these mattrasses, must render them sufficiently buoyant for any purpose they are likely to be wanted for. An experiment on one of them was tried in the Navy Yard at Charlestown, in the presence of Commodore Elliot; and one of them measuring on its surface five feet, ten inches, by three feet, sustained the weight of four hundred pounds, without sinking to the surface of the water; and it was the opinion of those who witnessed it, that it would have sustained double that weight. It is also evident, as its buoyancy depends upon the quantity of air contained within the mattrass, and as the quantity can be increased or diminished, by an enlargement in size or by compressing a greater quantity of air in the same dimensions, that its buoyancy can be increased at the pleasure of the manufacturer. The only difficulty which presents itself is, that the outside covering may, by any means, become perforated, and give the air a chance to escape. To obviate danger from this cause, a quantity of cork is placed in the mattrass sufficient to support a person in the water; thus, as a life preserver, in cases of accidents at sea, it can be depended upon.

There are other advantages pertaining to the *seamen's mattrass*, which nautical men will know how to appreciate. It is well known that animal material, such as hair and feathers, absorbs moisture, and retains infectious matter, which many diseases throw out from the animal system in a degree which renders it necessary that beds made of such material should be destroyed. It is known that vegetable material does not imbibe this poisonous effluvia in the same degree; hence these mattrasses are made entirely of *vegetable* material, and would not communicate contagious diseases, even if there were not another preventive; which is, no moisture can penetrate the *Caoutchouc* covering, and its outer surface is alone susceptible of becoming corrupted by the diseased parts which come in contact with it. As this surface is also a vegetable material, there is little danger of its retaining any animal poison that may

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be deposited upon it; and as it can be so easily fumigated and cleansed, the chance of its holding any deleterious properties is entirely removed. Seamen who visit tropical climates suffer much by the use of improper beds; and it is said that in Turkey, the fear of taking the plague by contagion, is so great, that beds are not allowed to be used on board of vessels. This article combines health and safety; and promises to mariners great and extensive usefulness.

But besides these considerations, there is another, which is of no small importance; we mean the *comfort* of our seafaring brethren. Everything which adds to their ease and happiness amidst their various hardships, is deserving of notice. A dry bed is not often the lot of those who are surrounded by water, and are so frequently exposed to storms; for the common beds used on board of ships, soon imbibe the moisture of the atmosphere, and become saturated with it: nor is it easily removed—for the process of drying such a quantity of wet material is slow, even when good weather furnishes an opportunity to do it; but the India Rubber mattrass is never wet; it effectually guards its possessor from that dampness which is so great an enemy to comfort and to health.

The advantages we have mentioned render the seamen's mattrass a useful article for hospitals and infirmaries for the sick. Various methods have been adopted to cleanse the beds of the sick by fumigation, &c.; yet these means cannot be entirely relied upon; and judicious physicians have found it necessary, generally, to destroy the beds of those who have been sick of malignant diseases. The *Caoutchouc* offers a preventive to contagion, from this cause, which may be relied upon. Its nature is to resist the infection which penetrates the common bed, and lodges its poison in its internal parts, corrupting the whole material of which it is composed, to such a degree that it cannot be removed. If it were only on the outer surface, the usual means applied for purifying would be sufficient to remove the danger: hence the seamen's bed cannot communicate infection with the least care; for it is certain, nothing which can propagate or nourish disease can penetrate its surface; and if this were capable of

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retaining the poisonous matter, it can be easily removed without destroying it. The action of heat and moisture has no effect upon its internal parts, and its surface alone is all that requires the care of those who use it.

These mattrasses are not only useful for the preservation of health, but are soft and comfortable for repose: the elasticity of air is superadded to the softness of the common bed; and these combined advantages are peculiarly adapted to the ease and comfort of the human frame, when seeking a position for quietness and rest.

It may also be mentioned, that they are free from that species of vermin which infests beds of ordinary construction: and the reason is, that the *Caoutchouc* causes a complete separation between the internal and external parts. These active enemies to slumber cannot live within, in its confined atmosphere; and if they could, they would be unable to annoy what is beyond their reach; nor can they remain without, and escape detection, or elude destruction. A gentle shaking of the mattrass, if these intruders should happen to effect a lodgement on it, would send these nightly marauders into the ocean, and more effectually cleanse the couches of our hardy seamen, than all the poisonous nostrums the most refined quackery has ever yet invented.

The difficulty of preserving cleanliness on board large vessels and ships of war, renders this a consideration of no small importance to those, whose experience has made them acquainted with the magnitude of the evil it is designed to cure.

We have dwelt at considerable length upon this article, from the various advantages it is calculated to bestow upon those who use it; particularly to mariners, both of safety and comfort. There are others of a domestic nature, which might be enumerated, but are too obvious to require notice. We have alluded to hospitals and infirmaries for the sick. The comfort of that distressed portion of our race, is an item which demands, and will receive the attention of every philanthropist. Everything which tends to relieve their sufferings will be eagerly noticed; and we doubt not the India Rubber bed will soon be classed with those

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essential articles of necessity, which misery and disease imperiously require. As an appendage to the mattrass, is the

India Rubber Cloth Pillow,

Which, in all but its size and form, is like the seamen's mattrass; is made of the same material, and possesses the same degree of buoyancy. The principal design of it is, to furnish a smaller and more convenient life-preserver, to be used on a sudden emergency. Its form is circular, with a hole in the centre, representing a rim of about ten inches in width. The sides are doubled together, as if the two parts were united by hinges, resembling a half moon. In this way it is used for the bed, but when danger is apprehended, the head and arms are thrust through it, and it forms a girdle round the body, capable of supporting a man in the water. This, with the *air belt*, a similar contrivance, though smaller and merely buckled around the body, is so useful and safe, that we wonder much that those who are fond of exposing themselves to the dangers of water parties in small frail open wherries, do not procure them for protection against accidents which are occurring year after year in our harbor. Who does not remember when, but a few short months since, the boat Bunker Hill foundered in a squall, and eight human beings, all active members of society, made their graves in the ocean, almost in sight of their own dwellings? It is known that on board that boat there was nothing sufficiently buoyant to support one person. Had they been provided with any of these articles, in all probability they would have been rescued; for aid was at hand, could they but have supported themselves for a few brief moments.

The Fire Engine Hose.

Caoutchouc cloth has been successfully used in making this article. Three lamina or thicknesses of cloth will sustain a pressure of one hundred pounds to the square inch: it is superior in strength to leather of the usual thickness, a more flexible substance, and can be more conveniently handled. The leathern hose is never perfectly free from leaks; consequently, there is a waste of water in using

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it; but the hose made with Caoutchouc cloth is always tight. The former becomes saturated with water, and requires a great expense of time and labor in drying; the latter avoids this difficulty, and can be stowed away immediately after it has been used, without injury. It is getting into extensive use, and its advantages are so apparent, that it must soon supersede the use of the leathern hose altogether.

The Portable Bathing Tub

Is a simple but useful contrivance, which every family should be supplied with. It is made of Caoutchouc or India Rubber cloth, suspended from a frame work from five to six feet in length, supported by legs which cross each other transversely, united by a pin or axle, so that it can be closed or opened at pleasure. The cloth sinks down from the frame work like a bag, sufficiently capacious to receive the whole body. When not in use, it is shut up, or closed; and as it then takes up but little space, it can be put in the corner of the room, or in any convenient place till it is again wanted.

Machinery Bands.

It has recently been discovered that the Caoutchouc cloth can be advantageously used for bands for machinery. Its adhesive tendency prevents it from slipping on the revolving cylinders as leather is apt to do. It is also much cheaper than leather, and equally as durable; is always flexible; does not become dry and stiff like leather; and, as far as experiments have been made, it has proved a good substitute for it.

This cloth is also valuable for *coverings for wagons*, as it effectually excludes water; and for *Mail bags*, to preserve letters and papers from injury when accidentally exposed to wet. This entitles it to the notice of Government, as an improvement that is likely to be of great benefit to the public.

There are doubtless many other uses to which the *Caoutchouc* will be applied when the public attention shall

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have been sufficiently directed to it. We have mentioned some of the most prominent articles for which it has already been used, in order to show its utility. Steamboats have already been constructed on the principle of increasing their buoyancy by confined air. What substance can be more useful for such inventions? We would suggest, too, whether the ceiling of the holds of vessels with it, would not tend to their preservation. Its advantages are numerous, and have not yet been fully developed. We cannot, however, omit to mention one practice, which we hope will be universally adopted. We mean the practice of placing India Rubber cloth between the soles of boots and shoes—a practice far more beneficial to health and comfort than the use of the clumsy India Rubber over-shoe. It gives the perspiration of the feet an opportunity to escape, and at the same time secures them from dampness. Experience proves that this perspiration cannot escape through the India Rubber; hence the whole foot should not be enveloped in it, and the operations of nature entirely obstructed. The difficulty is obviated by placing the India Rubber cloth within the soles, and about the edges of the shoe; as the healthy action of the system through the pores of the foot is not then prevented. How many females annually become the victims of consumption, arising from the exposure of their feet to wet and dampness; but in the way we have mentioned, the most delicate slipper may be an effectual security against an evil which we have annually so much reason to deplore. This, to the superficial observer, may appear a trifling item in the use of Caoutchouc; but we are persuaded that this, alone, will confer an immense benefit upon the human race.

[Furnished for the Tracts and Lyceum.]

PERKINISM REVIVED.

It appears by the Journal of Health for August, 1833, that an agent has been brought into notice by Francis Ernest Von Hildenbrand, Professor of Pathology and

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Practice of Physic at Paira, for the cure of various neuralgic affections. This instrument has received the name of the Anodyne Metallic or Galvanic Brush. It consists simply of a bundle of metallic wires, not thicker than common knitting wires, firmly tied together by wire of the same material, so as to form a cylinder about 4 or 5 inches long, and one inch or three fourths of an inch in diameter. This is applied to the pained part, previously moistened with sea salt, when it produces relief so instantaneously, it is said, that it appears to the patient like the effect of a charm. On withdrawing the brush, the uneasiness occasionally returns, but in a more endurable form. The longer the application is continued, the more decided is the effect obtained; and phenomena so singular have resulted from its application, as even to astonish intelligent persons quite on their guard against any magical illusion. The professor adduces one case in illustration, which he designates as altogether singular and wonderful. It was a case of tic douloureux of the face. By the application of the brush, the nerve-ache was repelled from one nerve to another, and that repeatedly, till the affection was greatly mitigated or altogether dissipated. It is not my purpose to cast upon the learned professor the imputation of philosophical plagiarism; but it may be justifiable and useful to institute a fair inquiry whether this hypothesis originated entirely in his own mind, or whether he is not in some degree indebted to the intellect of one of our New England physicians, the late Dr. Perkins, for the first intimation.

There is the clearest analogy in their principles, and the operatives employed to effect relief differ only in artificial form. I will now present to the reader the history of the metallic points, from documents in my possession, and from my own observations in the hands of the author. Dr. Perkins entered with peculiar zeal into a new project for the cure of diseases, which gained no inconsiderable celebrity at the time of its promulgation, in 1796. Conceiving an idea that metallic substances might have an influence on the nerves and muscles of animals, and be capable of being converted to useful purposes as external agents in medicine, he was induced to

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institute numerous experiments with various kinds of metals, till at length, after several years' pursuit of the object, he discovered a composition which would serve his purpose, and from which he formed his Metallic Tractors. These consisted of two instruments, one having the appearance of steel, the other of brass. They were about three inches in length, and pointed at one end; and the manner in which they were applied was, by drawing the points over the affected parts in a downward direction for about twenty minutes each time. The complaints in which this operation has been most useful, according to Dr. Perkins, are local inflammations in general, pains in the head, face, teeth, breast, side, stomach, back, rheumatism, &c. Dr. P. obtained a patent for his discovery, and travelled through the country to disseminate his new practice; and his career was attended with great success. Numerous cures were effected by the employment of the Tractors in his hands and in those of others. His enthusiasm pervaded all ranks, and received the countenance of many enlightened physicians and philosophers. Pamphlets were published to explain the modus operandi of the new remedy, and the professors of three universities in America gave attestations in favor of its efficacy. The operation was alleged to be similar in its principles to Animal Magnetism, or according to some, animal electricity or Galvanism.

The fame of the Metallic Tractors soon reached Europe. They were introduced at Copenhagen in 1798, where twelve physicians and surgeons, chiefly professors and lecturers in the Royal Frederick's Hospital, commenced a course of experiments, and reported the result to Professors Herholdt and Rafn. The experiments, fifty in number, were deemed sufficiently important to demand publication in an octavo volume. The professors introduced the term Perkinism, in honor of the discoverer, and asserted that it was of great importance to the physician. 'We do not find it possible,' say the professors, 'to apply with any justice against Perkinism, the arguments and doubts which have been raised against animal magnetism. Our experiments have demonstrated to our satisfaction, that there is a

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great deal of reality at bottom.' This book was translated into German, by Professor Tode, Physician to the King of Denmark, and thence into English by C. Kampfmuller. After the death of Dr. P., Mr. Benjamin D. Perkins, his son, repaired to London, and securing a patent, immediately published a tract on the discovery.

Soon after this, Dr. Langworthy, of Bath, having recently returned from America, commenced a course of experiments at Bath and Bristol Hot Wells, with a view of ascertaining the merits of the Tractors. The result was published in a pamphlet, containing a collection of cases, highly creditable, as he judged, to the metallic practice, with ingenious observations on the theory of their operation.

In 1804 the Perkinean Institution, as it was called, was established in London, chiefly with the view of benefitting the poor by the use of the Tractors. The Right Hon. Lord Rivers was President, and Sir William Barker, Vice President, of this Institution, and funds to a large amount were obtained by donations and subscriptions. In a pamphlet entitled 'An Account of the Perkinean Institution,' published in London in 1804, it is stated that the communications of cases are from disinterested and intelligent characters from almost every quarter of Great Britain, and that among others whose names are attached to these communications, are eight professors in four different universities, twenty-one regular physicians, nineteen surgeons, and thirty clergymen, twelve of whom are Doctors of Divinity. The cases published amounted in March, 1802, to about five thousand. Supposing, says the writer, that not more than one cure in three hundred, which the Tractors have performed, has been published, and the proportion is probably much smaller, it will be seen that the number to this time has exceeded one million five hundred thousand! In answer to the objection that the cure was effected merely through the influence of the patient's imagination, the promoters of the Perkinean Institution asserted that multitudes of cures were performed on infants and even on horses, where of course such influence could not be presumed to exist. In many parts of the country the use of

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the Tractors upon horses had become as general as on the human body, and numerous extraordinary cures were certified.

Such is the history of the Metallic Tractors. It is to be considered a singular and unaccountable circumstance, that the remedy should have been consigned to oblivion. Is it within the bounds of probability that the vast amount of authenticated evidence that has been produced, should be resolved into a delusion, a mere phantom of the imagination? However enthusiastic the promoters of the novel discovery may have been, it is most clear that autoptical evidence was in every instance at command, and might have precluded the possibility of deception. If, therefore, Perkinism has shared the fate of Animal Magnetism, there is no sufficient reason for supposing that its discoverer should be placed in the same class with Mesmer, as he undoubtedly was a man of honorable principles and character. T.

TELEGRAPHIC LANGUAGE.

[Extract from the Hon. John Pickering's Lecture on Telegraphic Language, delivered before the Boston Marine Society.]

[CONTINUED FROM PAGE 81.]

THE Telegraph used in this city (Boston) consists of an upright post having a small movable arm, at the upper end, called the Indicator, and two larger arms at convenient distances below the Indicator. The Indicator (which is used by itself, as will be hereafter explained) and the arms, may be placed each in six different positions. These several positions denote the numerals from 1 to 6; so that the two arms together may take twice six, or twelve, positions; and this number, by the familiar principle of permutation, affords sufficient signs to express any numeral, from one to hundreds of thousands; the numeral system being now used in this place.

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With the Telegraph are used three books, like dictionaries, containing sets of numerals placed in order, with the words denoted by them standing against those numerals; exactly upon the principle of a dictionary of any language. The telegraphic dictionary only differs from any other, in having a series of numerals, instead of a series of words, under each letter of the alphabet, with the meanings of the numbers affixed to them; just as in a French dictionary, for example, the French word would be put first, and then the English meaning by its side.

Now the arms of the Telegraph, being placed in certain positions, denote particular numbers; the observer, then, upon seeing the positions of the arms, looks into his telegraphic dictionary for the number denoted by them, and by the side of that number he finds the word signified by it. This is a general view of the principle of the invention. This numerical dictionary embraces, so far as can be anticipated by experience, all the questions and answers which are likely to occur between vessels at sea, or at the telegraph stations on the coasts. It also contains a list of numerals designating the names of vessels, and the names of the principal countries, ports, towns, cities, rivers, capes and harbors.

The first of the three books above mentioned may be called a general telegraphic dictionary, and is familiarly known by the name of Elford's Book.* The second is an extensive Appendix to Elford's Book, by Mr. Parker; and the third is called the Boston Harbor Signal Book, which, as its name imports, is for the particular use of the port of Boston. This book, besides a considerable number of important questions and answers, contains a list of 1200 sail of vessels belonging to Boston and other ports of the United States, the name of each of which is designated by a particular numeral; which saves the trouble of spelling the name letter by letter, as must be done in the case of vessels whose names do not happen to be in that list. This, as you will perceive, is a great saving of labor and

* From the name of Mr. Elford, the respected author, who resided in Charleston, South Carolina, and died a few years ago.

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time,—as in spelling the name of the brig Boston, for example, which has six letters in it, there must be six distinct signals, or operations, by the general method; while by means of the Harbor Signal Book, which contains her name with its corresponding numeral, a single operation will be sufficient.

You will naturally ask, how the observer is to know which of the three books he is to look into in order to find the numbers given by the telegraph. This is easily explained. Each of the three books has its appropriate designation. The first of the books, as I have observed, is known at the telegraph stations by the name of Elford's Book; and when this is to be used, it is designated by the Indicator, or small upper arm of the telegraph, by two positions, denoting 6—4, which may be called the numerical name of that book. A brief exemplification will make this intelligible. When the observer at one station wishes to communicate with the other, he places the Indicator in a perpendicular position; in which it is kept during the whole time of the communication, except when changed to designate one of the books, as explained hereafter. Let us suppose that an observer at one of the stations should wish to inquire of the person at another, whether he had anything to communicate. This question will be found in Elford's Book. Now before asking the above question, the observer puts the Indicator, first into the position denoting number 6, and then changes it immediately to the position for number 4; which is noted down on a slate or on paper thus, 6—4; the person inquired of then knows that he is to look into that book for the matter in question, whatever it may be. The first observer then has recourse to the two arms of his telegraph; with which he first makes the signal denoting the numerals 4 and 3, and then immediately adds the signals for 2 and 4, thus making the entire number 4324, against which number in the book, the person at the other station finds this question: Have you anything to communicate? Being thus possessed of the question, he prepares to answer it; and as his answer, either yes or no, is to be found in Elford's Book, he also in the first place, by means of the Indicator, gives the numbers

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6—4 to denote that book; and then immediately answers by the sign for number 4, which means yes, or by number 1, which is no. The whole operation may be set down as in the following table; in which the explanations are added in words, for the convenience of the reader, though in the actual operation nothing but the figures would be written down by the observer:

Question by the first Observer:

Numbers by the Indicator.	Numbers by the Arms of the Telegraph.	
(Elford's Book) 6—4	4324	Have you anything to communicate?

Answer by the second Observer:

(Elford's Book) 6—4	1	No.
6—4	4	Yes.

The second book is a very copious Appendix to Elford's Book, by Mr. Parker; who, in order to extend its usefulness, has very judiciously added, in a distinct column, the Numerals, Phrases, &c. of the Holyhead Telegraphic Establishment in Great Britain; which is highly important to the interests of British and American commerce; there being a line of Telegraphs along the coast of England, from Holyhead to Liverpool. Mr. Parker's Book also is designated by the Indicator; not however by one fixed and invariable number, but by several different combinations of numbers, each of which at once directs the observer to a particular subdivision or letter of the dictionary, instead of the entire work; and under the letter designated by such numbers will be found the principal or important word of the sentence. For instance; suppose the indicator should give the numbers 1—5. Now as this number does not denote Elford's Book (which is 6—4,) nor the Boston Harbor Signal Book (which is 6—5,) it follows, that the observer is to look into Parker's Appendix. In that it will accordingly be found, that the numbers 1—5 denote the subdivision or letter D, under which the principal word or subject of inquiry will be seen. After this,

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if the following numbers, for example, should be given by the arms of the Telegraph—2,—6,—4,—the observer would find against that number under the letter D, the following: '2, 6, 4, is in great DISTRESS and requires immediate assistance.'

The Harbor Signal Book is designated by the numerals 6—5, by the Indicator. Each of the three books, therefore, having its appropriate name in figures, no embarrassment can ever arise as to the particular one to which the observer is to refer.

In order further to illustrate a telegraphic operation, as practised in this port, I subjoin (in a note) an actual case which happened not long since, and in which the rapid communication, by the aid of the Telegraph, was the means of relieving and preserving the lives of the seamen. Several other real cases, some of them of extreme urgency and distress, might also be mentioned.*

The Telegraph at the Observatory on Central Wharf communicates with three stations in our lower harbor; one upon George's Island; another at Point Alderton, Nantasket Heights; and the third at Rainsford Island, the Quarantine establishment. The distance of this whole

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Indicator.	Nos. by the Arms.	Explanation of the Numbers.
3	6224	Ship Undine of Duxbury,
4	1664	Fifty-seven days' passage
5	3162	From Cadiz.
1—4	2634	Ship's crew
5—1	1 3	Unable
4—6	455	To
5—3	1345	Work.
4—5	525	Will you send
4—5	1512	Six
3—4	494	Men
2—5	65	Immediately?
ANSWER.		Yes.
6—4	4	

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line is about twelve miles—and intelligence may be conveyed through the line in about two minutes.*

Thus far I have given you an account of telegraphic operations by land, where we can erect elevated objects, and have a distinct view of the arms or signal boards of a telegraph. But it is obvious this method would be impracticable at sea.

To supply this deficiency, an essential improvement has of late years been introduced, by means of flags, and called the Marine Telegraph. The use of flags rests upon the same principle with the arms of the land telegraph. They are six in number, and correspond to the six positions of the arms of the land telegraph; denoting the numerals 1, 2, 3, 4, 5, 6,—they are each blue and white, and all of the same size; with duplicate numbers of each flag. To these is added a Conversation Flag, which, like the Indicator of the land telegraph, shows that the ship making the signal wishes to converse.† Nearly ten thousand

* This establishment was commenced seven years since; and employs five persons constantly on duty from sunrise to sunset,—who never quit their stations at any interval without giving previous notice to all the other stations of their intended absence, by a concerted signal to that effect.

The following abstract statement gives an annual account of the aggregate number of vessels whose arrivals have been announced and reported to the commercial interests in this city, from September, 1824, to March, 1833.

From September, 1824 to	1825,	634
	1826,	766
	1827,	864
	1828,	836
	1829,	923
	1830,	1010
	1831 to March, 1833,	1965
	Total number telegraphed,	6989

† To exemplify more fully the great utility of the Flags, or Marine Telegraph, I am happy to add the following communication from an intelligent navigator and merchant of this port, Bryant P. Tilden, Esq., whose authority as a practical man gives the greatest weight to his statements and opinions.

'The first time (by way of illustration) I experienced the advantage of flag conversation was in the year 1815, on board the ship Canton, in south latitude, less than three months after the war with England.

'We saw five big ships spread in line, by signal orders, to prevent our passing them. Having proper documents to inform of peace, we ran up our colors and stood for the centre ship. The boarding officer, on being satisfied, said, "Run up your ensign in the fore rigging. That is our signal agreed upon to inform the squadron that peace between our two nations has been made; and it will save you the trouble of being overhauled, and detention."

'After informing the officer of Bonaparte's escape from the island of Elba, he directed us to hoist the ensign in the main rigging, saying, "That is a signal to inform of news." The seventy-four and four frigates were at the time sailing in a

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changes or combinations can be made, designating the words and phrases in the books above-mentioned. By these means, ships at sea can communicate with each other even at the distance of several miles; and when they approach the coast, can hold communication with the land telegraph.

From this illustration of the uses of the telegraph by land and sea, you will be able to form some judgment of its vast importance to a great commercial country, possessed of such an extensive sea-coast as ours, and having a constant intercourse with all parts of the globe. I say nothing of its incalculable value in case of a war, when a rapid communication of intelligence may be of vital importance to the whole population of a town, a city, or even of the country at large; but in ordinary times of peace, and in the usual course of commercial business, when we consider its utility, in the preservation of property, and above all, the lives of our sea-faring brethren, we cannot sufficiently appreciate the great value of this invention. I cannot forbear alluding once more to a case which actually happened not long since in this port,—the case of the Boston. When that vessel was relieved by means of a telegraphic communication, the wind was blowing so strong off shore, that it would have taken her boat several hours to have come up to the city for assistance; it would have been night time, too, when she reached the wharf; then there would have been the delay and trouble of getting ready the necessary articles to be sent down to her, which would have required in the whole several hours;

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lazy cruising manner, but immediately on seeing our last signal, the Admiral began conversation with the fleet; and, as if by magic, up went top-gallant-mast yards and booms, and in twenty minutes they were under a crowd of canvas. The officer, seeing the signals from the Admiral, said, "That is for me to go on board, and for all hands to get to Old England as soon as we can." Without these talking flags it would have taken hours to have communicated three such important points by means of boats or otherwise.

'One more instance happened a year before the last, when I was going in company with several English captains from Macao to Whampoa in an English schooner packet. When in sight of the shipping, the tide turned down river, and it being calm, we came to anchor. Fortunately, the packet had conversation flags, and on signal being made, down came four boats to take us up to Canton, where otherwise we should not have reached until the next tide.

'Sometimes a boat cannot live upon the sea, and it may blow a gale, which prevents speaking. Our Conversation Flags, in such cases, obviate all difficulties.'

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and, perhaps, by the time assistance had reached the spot, the vessel, with her exhausted crew, would have been swallowed up in the depths of the ocean. But by means of the telegraph, which despatches its intelligence without regarding either winds or waves, requisite information reached our city in about ten minutes; and in the short space of fifty-five minutes from its arrival, a boat was fitted out with every necessary for the occasion, and in about two hours was actually on the spot, affording the desired relief to our perishing brethren.

[TO BE CONCLUDED IN OUR NEXT.]

THE SOMNAMBULIST.

THE following communication is from a distinguished physician of Worcester, (Mass.) where the young woman, the subject of so much interest, of late, is residing.

WORCESTER, JAN. 29, 1834.

To the Editor of the Tracts and Lyceum.

Audubon, in a late letter to a friend, thanks him for his present of 'Smith on Fishes,' and says that he nevertheless prefers *fowl* to *fish*. You, on the contrary, very naturally prefer *fish* to *fowl*. Let me assure you that I deal in neither.

You have, of course, heard the wonderful stories told of the somnambulist; and it would not surprise me were you to have considered it all as an ingenious device, or as cunning trickery. It is neither. I have had some opportunity of observing the wonderful phenomena in the case of this young woman; and, without entering into any discussion or speculations, I will no longer delay my intention of briefly stating to you what I know of this case, and leave you to draw your own conclusions.

I was at the hospital one day soon after her arrival, when the Dr. (Woodward) informed me that Jane was in a paroxysm. I went with him to her room, and found her apparently in a disturbed broken sleep, sitting in a low

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chair, and leaning her head against the casement of the window. She appeared like a person who had dropped to sleep in a position which was uneasy to her: her eyes were closed: she, however, answered Dr. Woodward's inquiries in a rational manner; and, at his request, sang 'Days of Absence,' in a sweet plaintive voice. She occasionally sighed deeply, as if her sleep was oppressive and dreamy. Nothing more occurred at this time, as she soon came out of the paroxysm, as one awakes from sleep. The duration of this paroxysm was evidently shortened by the use of the nitric muriatic acid foot bath, which was then applied for the first time.

For some days after this, her paroxysms were slight, and I feared that nothing more interesting would occur. My fears were soon dissipated. Dr. Woodward met me one afternoon, and told me that Jane was in a paroxysm, and was playing backgammon with Mrs. Woodward. I went immediately to the hospital. She was in Dr. W.'s parlor, playing backgammon with Mr. Woodward. A large white cotton handkerchief was folded in pretty wide folds and bound closely over her eyes, and tied tightly behind her head: her plump and prominent cheeks, with the width and the tightness of the bandage, rendered it impossible for her to see from underneath this dense covering; nor did she at any time attempt to do so, but directed the eyes as if no impediment to direct vision existed. Her eyes I did not see. Dr. W. informed me that they were invariably closed. The occasional sigh and the unquiet motions of the body were those of a deep sleep in a debilitated system; but not to such an extent as would have excited observation, had not the attention been otherwise excited. She modestly answered my salutation of 'Good afternoon,' as I entered, and, as the game was soon at an end, accepted my invitation to play with me. She had played the game that morning for the *first time*, and this was the *sixth time* she had played it. I call myself a tolerable player, having played some hundred games. You can imagine how my wonder and amazement, already so high, were increased, when in a few moments I found myself *beaten* by my fair and sleeping antagonist!! Lest

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this might have arisen from my negligence, I challenged her to another game, to which I gave my undivided attention, and succeeded in winning the game; but so closely was it contested, that she had but three men remaining, and they on the 1st and 2d points! Not the least wonderful part of this affair, was her ardent *conception of the principles of the game.* During the first play, seeing her at a loss how to move, I kindly offered her my advice; but this she declined, and made moves which I found were ultimately much more to her advantage than those I suggested would have been! All this on playing the sixth and seventh games!! Here *was not,* here *could not* be any deception. So faint were the marks on the dice, that my near-sightedness made me frequently bend over to distinguish them. The position of her body was such that she could not have seen from beneath the bandage, even had any apertures been left! All vision *must* have been directly through the broad and thick bandage!

She played a number of games with other gentlemen, during which I watched her narrowly; there was no confederate in the room to aid her. She did not resort to *touch* to determine the dice, or to guide her movements—her position and her manner were those of her antagonist! In a few moments after, she awoke, (previously to which she had gone into the next room.) Her attention was again called to the backgammon board, as if undesignedly, and she was asked to play. She answered that she knew nothing about the game, and had not, for a long time, seen a board. On being urged to try to play, her awkwardness proved her sincerity. I met her in the hall, the next day, and found by her embarrassment, on my addressing her as an acquaintance, that (as she told Dr. W.) she did not know me!

I could go on for page after page, in relating the interesting particulars of this extraordinary case, and would certainly do so, were it not for the fact, that Dr. Belden will, in a few days, publish a full and minute statement of the case, which will give you a more satisfactory history than I can. Still, some few particulars I will mention.

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When she came to the hospital, among the symptoms of her case were coldness of the extremities. As I mentioned above, the first application of the acid foot-bath evidently shortened the paroxysm. This and other means removed some of her complaints, and the *character of the paroxysm became essentially changed!* She no longer possessed that *painfully* acute susceptibility of light which had previously obtained, and her powers of vision were no longer extraordinary. Her paroxysms now assumed more the character of ordinary mental aberration than heretofore. While in them, her eyes were open, and their existence was known by the difference in her manner, disposition to mischief, restlessness, &c. She was conscious of what she had said and done in her previous paroxysms, but unconscious of all that had passed in the interim. Having received a letter during one, in the next, three days afterwards, she wrote an answer to it, in which she says, 'I received your letter yesterday.' When in a state of sanity, she, in like manner, had no consciousness of what had passed during the paroxysm.

Her 'turns,' as she calls them, are now comparatively light. Her condition, while in them, appears to me to be one between sleeping and wakefulness:—in truth, she then wakes as others sleep. She appears to possess two distinct existences; and she passes from one into the other, as she and we do into and from sleep!

There are *some* evidences that the sense of hearing was, at one time, morbidly acute: evidently this state of increased power was not confined to the *eye*. Dr. W. said to her one day, as he passed her in the hall, 'Jane, if you feel sleepy you must sing to keep yourself awake.' 'Sing,' said she, 'I do n't know any song; and I could n't sing a word, if I did. They say I sing when I am asleep, but I know nothing about it.' Of course—'unless' (says the sceptic) 'she is a cunning cheat'—these songs were learned in earlier years. So true is it, that we never forget. The delicate tracery of early impressions is hidden under the deeper and sterner stamps of maturer years, but it is all there, oftentimes never looked upon again; but now and then, by some strange and unwonted power,

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some deep and intense sympathy, brought up in all its truth and freshness.

I have not undertaken to give you a full and methodical account of this case. My letter has already extended beyond its intended limits. I am aware, much doubt exists in relation to these statements, and I know not but you are among the unbelievers. I was a little surprised to see Dr. Miner's communication; and was sorry, too. I am sure he never would have written it, had he known where and how she was situated. I have not combatted doubts in this hurried communication, but have written *right on*. You will, therefore, excuse the irregularity and confusion of my statements.

I ought to have stated, that the manner of the commencement of the paroxysm was, that she would, after a few moments of listlessness, drop suddenly fast asleep, if that state can be called sleep. She then would complain of the intense pain which the ordinary light occasioned, and solicit the bandage to be placed over the eyes, to protect them from the influence of it. She would then converse freely, sing, &c. The first paroxysm I witnessed, was an imperfect one. After a few common-place questions in relation to her health, &c.—a 'how do you do,' &c.—she sang, as I before stated. Dr. W. then asked her, 'Do you know where you are, Jane?' 'Yes, sir; I am at home.' 'Where is *home*?' 'Why, at Mr. ———'s house in Springfield, to be sure;' and then in a minute added, 'O dear me! no; I am at the Hospital in Worcester.' Immediately afterwards, she came out of the paroxysm, which was evidently affected by the nitric muriatic acid bath. From this and other circumstances, I prognosticated her recovery with a confidence greater than I expressed.

There has been, from the commencement of her disorder, severe pain in the head, especially in one spot, which corresponds with what the Phrenologist calls the organ of 'marvellousness;' and, indeed, she says she has generally had pains in that spot, ever since she can remember. The pain in this spot is very similar to that in hemicrania. As

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you would expect, there has been strong and evident determination of blood to the head.

I can now see no reason why her recovery may not be confidently anticipated to be established soon. She does not present any appearance of disease, but is a plump, hearty, buxom girl, with a rosy cheek and lip, and bright eye, which, I think, have entitled her to the appellation of 'Sleeping Beauty.'

I have now, my dear Doctor, given you an *imperfect, crude*, and necessarily *hurried* account of this wonderful phenomenon, for your gratification and that of your immediate friends. Dr. F. may be gratified by its perusal, and I should like you would show it to him.

You will naturally ask me my own opinion of this case. I may as well not give it; but this I will say, that I consider the experiments which have been made, which will be fully stated in Dr. Belden's work, *as entitled to the fullest confidence.* In my own experiment, *there could not have been any deception*; it is morally impossible that there could be any; and wonderful as it was, I hold it less a violation of the laws of nature and of evidence, to believe that the experiment was fairly and conclusively made, than it would be, to believe that there was *any* trickery or deception practised by the patient. I ask no one to believe with me, till he has fully examined all the evidence: if that will not convince him, his own senses would not.

My theory is, that from various causes—some obvious, others perhaps not so—there was a determination of blood generally to the head, and especially to the organs of vision, as was evidenced by the susceptibility of the eye to light, so that at this time, by this cause, (and perhaps by other causes of which we know nothing) there was a power of vision afforded her, sufficient to enable her to see through the dense media which were placed between the object and the organ. She could only see through objects which were not, in themselves, wholly impervious to light. She could not read through a board or a book. The first check to this determination of blood, and the first effort which assisted nature made to equalize the circulation, destroyed this acuteness of vision.

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That the faculty of vision should have been so powerfully affected, while none of the other senses were sensibly affected, goes far to give the Phrenologist an unanswerable argument in favor of his position, that the brain, like modern Cabinets, is not an Unit. But I do not profess to understand Phrenology. The Hospital presents a fine field of research for the disciples of that science; and I am surprized that it is so neglected by them.

GYPSUM.

In the country about Salina, the place where the principal manufactory of salt is, there are immense quantities of gypsum. It appears that there is some natural affinity between gypsum and salt. Mr. Pennant thus speaks of Northwich, a small town long famous for its rock salt and brine pits:—'The stratum of salt lies about forty yards deep. Above the salt is a bed of whitish clay (argilla cœrula-cinerea) used in making the Liverpool earthen ware, and in the same place is also dug a good deal of the gypsum, or plaster stone. The fossil salt is generally yellow and semi-pellucid, sometimes debased with a dull, greenish earth, and is often found, but in small quantities, quite clear and colorless.'

A Remark.—A periodical writer in the year 1752, in speaking of preceding years says—'While the theological profession exhibited a more respectable appearance from the transatlantic education of many of our divines, the state of our seminaries of learning displayed a most humiliating spectacle. "Our schools," says the colonial historian, "are in the lowest order. The instructers want instruction, and through a long, shameful neglect of all the arts and sciences, our common speech is extremely corrupt,

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and the evidences of a bad taste, both in thought and language, are visible in all our proceedings, public and private:" and, at that time, there were instances of some magistrates who were totally ignorant of the first rudiments of instruction.' How is it now?

ORIGINAL MISCELLANY.

SCIENTIFIC DOINGS.—A regular meeting of the Society of Natural History was held at their hall, on Wednesday, Feb. 5, Mr. George B. Emerson in the chair. Twenty-eight members present. The records of the preceding meeting having been read, the following donations were announced:

To the *Cabinet*—a specimen of the *(Dionæa Muscipula)* Venus's Fly-trap, from Wilmington, N. C., by Mr. Curtis.

The golden eagle, *(falco fulvus)* measuring 7 feet 10 inches between the tips of the wings; and the white-winged coot, by Mr. Tappan.

A Coaita monkey, by Dr. J. V. C. Smith.

An iguana, a splendid species of boa, and the skin of a very large boa, from Surinam, by Dr. J. D. Fisher.

A bottle containing several specimens of crabs, *(genus pinnotheres)* by Dr. Odin.

A numerous collection of lavas and petrifactions, from Antigua, and a magnificent beryl, 3 feet 4 inches in circumference, from Ackworth, N. H., deposited by Dr. C. T. Jackson.

To the *Library*—Ray's Works of the Creation, and Philipp's Voyage to Botany Bay, presented by Edward Tuckerman.

Nuttall's Travels in the Arkansas Territory, presented by the author.

Gesneri Res Fossiles, deposited by Edward Tuckerman.

An exceedingly interesting paper, in defence of the author of the 'Birds of America,' by the Rev. John Backman, of Charleston, S. C., was read by Dr. Gould. This paper is soon to appear in a Journal published by the Society. After the reading of the paper, upon motion of Dr. Lewis, it was voted unanimously, that the Bos-

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ton Society of Natural History entertain the highest respect for the moral character and scientific acquirements of Mr. Audubon, and would commend his writings as entitled to the fullest confidence.

[☞ NOTE.—As we have understood that some gentlemen who were present at this *conversazione* misunderstood the remarks of Mr. Dixwell, while seconding the resolution offered by Dr. Lewis, we beg leave to state distinctly, that Mr. Dixwell's object, as we understood him, was to say, decidedly, that the results of the experiments made abroad, upon the senses of birds of prey, a minute of which was in his possession, taken from an English Journal, was in perfect *accordance* with the result of those made by the writer of the communication which had been read to this Society. Hence, he merely expressed his surprise that any controversy should have arisen, caused by animadversions of English writers on the work of Mr. Audubon, they having, as it would seem they might have had, those very results before them. We trust that Mr. Dixwell will not be offended at our endeavor to place his words in their true light.—EDITOR.]

Mr. Charles C. Emerson gratified the Society with a description of the 'little auk,' presented at the last meeting. He also made some general observations upon a species of snipe, which had been presented him.

Dr. Gould remarked that this was the identical bird, of which an account had appeared a short time since in the newspapers of this city: it was there described as a strange bird; and was caught on one of the wharves, perfectly exhausted.

Dr. Smith observed that it was not a little singular that this bird, the jack snipe, should have been considered as a stranger here; he had heard the keeper of the island remark that *large flocks* were not unfrequently seen flying near that spot.

Dr. Chas. T. Jackson, to whom was committed the beryl, deposited at the last meeting, favored the Society with an account of the analyses, external characters and uses of the emerald and beryl. He likewise gave an interesting account of the lavas and petrifactions, deposited by him to-day.

Dr. Otis, chairman of the committee to consider and report upon an alteration of the By-laws, in respect to the removing of articles from the Hall of the Society, for exhibition at lectures or other purposes, reported that that committee had attended to the duty assigned them, but begged leave to report at a future meeting, as one of that committee was now absent. This request was granted.

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The resolutions offered by Mr. George B. Emerson, at the last meeting, proposing the appointment of committees in this Society, to examine and report upon the different departments of Professor Hitchcock's Survey, having been called up and read, upon motion of Mr. Isaac McLellan, Jr., it was voted, that a committee of nomination be now appointed, who shall designate suitable persons to perform these several duties, and report at a future meeting. The Chairman, Secretary, Chas. T. Jackson, Isaac McLellan, Jr. and Dr. Gould, were chosen this committee.

Mr. Samuel Wigglesworth read a very satisfactory report upon the cranium of a barbiroussa, presented at a previous meeting.

Dr. J. V. C. Smith requested that he might be allowed the liberty of publishing the doings of the Society in a scientific periodical, conducted by him. After a prolonged desultory conversation upon the subject, it was voted, that Dr. Smith have permission to publish the records of *this meeting*, and that a committee of five be chosen to examine his request, and report at the next meeting. Dr. Otis, Amos Binney, Dr. Lewis, Chas. K. Dillaway, and Isaac McLellan, Jr. were appointed this committee.

Upon motion of Mr. Dixwell, voted, that the records of the last meeting be altered, that they may accord with facts.

[☞ Note.—The Recording Secretary, Dr. Storer, was absent on the evening alluded to in this motion.—Editor.]

The following gentlemen were chosen to report upon the articles presented to-day:—The eagle and coot, Mr. Tappan; the monkey, Mr. Este Howe; the iguana and boa, Dr. Odin; the crabs, Dr. Gould; the Works of Ray, Mr. Dillaway; Philipp's Voyage, Dr. Howe; Nuttall's Travels, Dr. C. T. Jackson; the Work of Gesner, Mr. Weston.

The gentlemen proposed for membership, at the last meeting, were unanimously elected, viz.:—Robert C. Winthrop, Ivers J. Austin, Thomas J. Bouve, Samuel Cooper, Wm. Ingalls, Jr., Benj. F. Wing, and James Jarvis.

The following gentlemen were nominated as candidates:—Geo. A. Sampson, proposed by C. C. Emerson; Charles S. Storrow, by C. K. Dillaway; Charles G. Putnam, by J. B. S. Jackson; Augustus A. Hayes, by Chas. T. Jackson; Henry Artemas Ward, by John Odin, Jr.; John Bethune, by A. A. Gould; Mr. Rodman, by A. A. Gould.

Voted, That the Secretary be requested to give public notice in future, of the meetings of this Society, in an evening paper of the

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day previous, and in one of the morning papers of the day of the meeting. The meeting was then adjourned.

[We strongly recommend the claims of The Boston Society of Natural History to all the friends of science in the United States. The cabinet is becoming very rich in rare productions. Whatever may be forwarded to the collection, sent to the care of the editor, will be carefully and speedily deposited. The Museum of this Society, of all others, is the place where specimens are well arranged and well preserved. Minerals, birds, skeletons of animals, reptiles, insects, and, indeed, whatever can be considered in the light of a natural curiosity, in the animal, vegetable or mineral kingdoms, are particularly desirable.

Presuming this journal falls into many hands where the heavier and more costly periodicals are not always taken, we have been the more particular in making this request in behalf of this very valuable association, that nothing may be lost that might be at all serviceable in illustrating the wonders of Creative Power.—EDITOR.]

MYOLOGY.—Muscles are the flesh, constituting the bulk of the covering of the bones.

Muscles are instruments of motion, acting upon the bones in such a manner as to change their position. No movement can possibly be effected without the agency of a muscle. In order to produce such a vast number of diversified motions as are characteristic of most animals, every moment of time, their number is necessarily very great, and their figure, locality and power, are precisely adapted, and admirably contrived for effecting them.

Some are exceedingly long, as the *Sartorius*, which reaches from the top of the hip bone to four or five inches below the knee, in order to cross the limbs; hence its name, *Sartorius*, or tailor's muscle, from its office. Others are broad, thin, and of considerable extent, assisting other muscles. An example of this kind is found on the back of the neck, in the *trapezius*, which is so admirably fitted to the part over the shoulder-blades, that it reminds one at once of a cape. It is thought that this article of a lady's dress was suggested by viewing the shape of this admirably contrived muscle. In a common grasshopper there are not far from three thousand muscles, according to some writers, but in man there are only about five hundred.

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To Correspondents.—We had laid out A. Y.'s interesting communication, from Craftsbury, Vt., for the compositor, but, by some unaccountable mishap, it has been lost; and notwithstanding a general overhauling of every article of furniture on our premises, we have not yet been able to recover it. If Mr. A. Y. has a copy of the article in his desk, and will forward it, he will lay us under lasting obligations. It related to the Quadrature of the Circle.

P. S.—A reading neighbor merely cried presto, and the lost Sibylline leaves came to light again. There is just room enough in this page to express our satisfaction, and to warn our kind friends that if they meddle with the editor's papers hereafter, it will be at their peril. ☞ A little learning is a dangerous thing. ☜

Dr. T—— makes an unnecessary complaint: we neither know nor care a fig about the matter.

Aquaductus is respectfully informed that the subject of his letter is interesting. We have ourselves been investigating, of late, the character of the water of this city, and therefore fully coincide with him.

Marcia, it seems, is a lady. No one can more highly respect the ladies than ourselves; but, ungallant as it may seem, her scissorizings are inadmissible.

Birds of Florida sing very well: they shall have an opportunity of sounding their notes directly.

Electricity came seasonably, to put us in mind to ask some gentleman to contribute a more elaborate essay on that subject.

C. C. P. possesses a fund of useful knowledge, but it is utterly impossible to decypher his hieroglyphics. There are pages enough in his manuscript to make an almanac; but all the drogomen of Constantinople, in conclave assembled, would be discouraged with this production. Really, we do not know whether it is Hebrew, Turko-Armenian, Sanscrit, Roman-rustic, or English. Pray be particular in future.

From New York, Feb. 7th. We have a personal acquaintance with the gentleman to whom the writer refers. We agree with him that it is lamentable that a man of so much learning should be so intolerably indolent. We fear it is becoming characteristic of our literati, in the United States, to make little or no exertion. There are hundreds of talented men in this country, at the present moment, who sputter away for an hour or two in different scientific associations; occasionally hold up their hands for or against a motion; look very gravely and profoundly, ten minutes at a time, in presence of their admirers; fumble over books which they cannot always comprehend; and pass through life for great men, just as the owl gained a reputation for wisdom, by staring all other birds out of countenance. When they die, hic jacet will be cut upon their tomb-stones, but their memories will not live six calendar months. Industry is indeed the philosopher's stone.

'He who would thrive
Must rise at five.'

The Philadelphia Correspondent has been very obliging. We here again take the liberty of requesting gentlemen to forward essays on any subject that promises to add to the common stock of useful knowledge. We are not particular as to the length and breadth of the article.

Platinum belongs to this publication as much as to any other. Ours is not a baggage wagon, so lumbered up that it scarcely moves; no, with light freights, it travels with prodigious speed, and therefore, in the course of a year, accomplishes just as much as a heavier vehicle.

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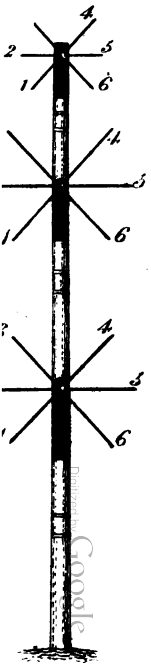
J. R. PARKER'S SEMAPHORIC TELEGRAPH.



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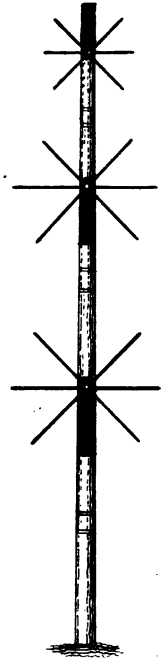

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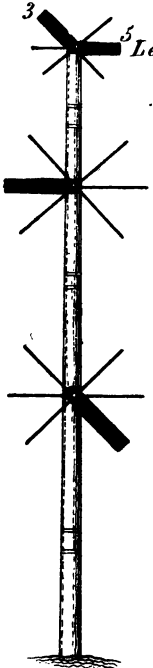

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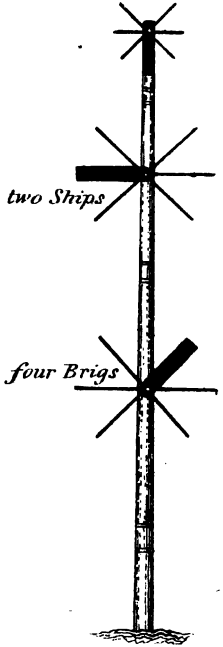

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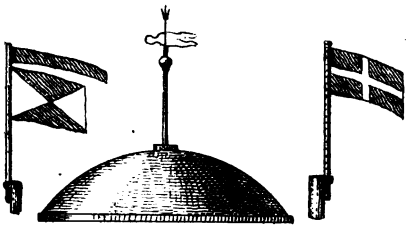
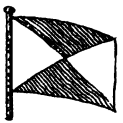
UNIVERSAL MARINE TELEGRAPH.

OBSERVATORY



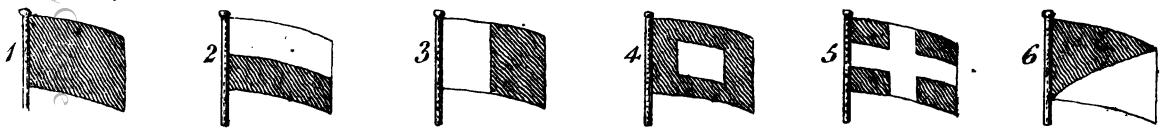
28 CENTRAL WHARF.

CONVERSATION



FLAG.

NUMERICAL FLAGS.



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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

MARCH 1, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

PRUSSIA:—ITS POSITION AND DESTINY.

BY N. H. LORING.

THERE was nothing of the ideal and romantic in the character of Frederic the Great; nor is the nation fashioned and established by him, other than a mighty illustration of the severe and sinewy sagacity of his mind. The unique and awful tragedies which the French revolution introduced, one after another with startling rapidity, to the historic inquirer at the close of the reign of Frederic; and the dazzling and astounding career of another conqueror which succeeded, tended to deprive his character and polity of that consideration and investigation to which they were entitled, and which, at perhaps any other period, they would have received. The effects which might reasonably have been anticipated from them, upon the international and social policy of the European states, were, it is probable, greatly modified, and in some respects frustrated, by the extraordinary events alluded to, which shook the oldest thrones, and affected, either for good or for evil, the most stable institutions. Yet neither the intellectual reign of this rare king, nor the character, compact, capacious, and acquisitive, which the Prussian people derived from his plastic hand, was of a kind to lose its potency from a brief transit of the sabre-rule of Napoleon. Still less, to have its moral influence expire during the years of cruel and imbecile misrule in Europe, which have since elapsed.

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Why should not that potency—that influence—have been annihilated? This question it is proposed to answer—not directly, but conclusively, in the reflections which are to follow.

New alliances, new combinations, have been formed since the days of Frederic. The relative positions of states have changed: the 'Family Compact' is extinct: France and the second grade of German states have liberalized their institutions: the Germanic empire is dissolved: the English nation is no longer governed by the tyrannic temper and obtuse minds of Hanoverian blockheads: the 'STAR of the House of Austria' is not now the bugbear to frighten feeble-minded ministers into wars, and a feeble-hearted people into subsidies. All is changed—changing. All—except the creation of Frederic—the great offspring of a great conception, which has in no wise altered, excepting in additional firmness of muscle, consolidation of texture, expansion of stature, and general vigor of frame: there it is, standing in the centre of Europe, a young, clean-limbed, and fearless giant; offering, in reality, that barrier which Poland was once, poetically, supposed to form to the half-civilized Russians. On the other side, it can and will awe those propagandists, who, if they renew their excesses in the name of Liberty, must retard, more than anything else can, the march of Europe to general civilization and freedom. To all the world, it is an illustrious demonstration, that in despite of a generally poor and sterile soil; an inhospitable climate; disconnected and very irregularly shaped territories; without natural boundaries; and with little of the wealth that springs from commerce; it is possible for a nation by its frugality, its industry, its devotion, throughout all grades and classes, to every description of intellectual improvement, and animated by a fervid and indefeasible patriotism, to enjoy, even under the rule of an absolute monarch, a greater portion of personal freedom, domestic happiness, and true civilization, than ever has been realized under what are termed the free governments of ancient and modern Europe.

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The foregoing assertion, which is intended to be deliberately and perspicuously made, is not a paradox. It may amaze those who yield an unsuspecting confidence to the newspaper literature of London and Paris; who profess to believe the trashy and inconclusive eloquence of the French deputies; and think, that on the barbarous strength of Eastern, and the noisy but insecure freedom of Western Europe, the destiny of that quarter of the world is dependant. It may, likewise, be somewhat unpalatable to all those inflammable spirits who discourse in heroics upon liberty, and incessantly utter oracular common-places about the free nations of antiquity, as if anything like a rational and orderly freedom, either physical or mental, ever had existence in the little anarchies of Greece, or the bandit commonwealth of Rome. And here it may be well enough to remark, that good taste and truth alike disown the comparisons, so frequently instituted, of the American people with those ancient communities. It is a lamentable truth, that through many past ages the youthful mind has been sedulously imbued with the scholastic jargon of Grecian and Roman liberty; but it is equally indubitable, that an attempt to impose any such sort of liberty upon this people, either previously or subsequently to the fight of Bunker Hill, would have been met by them with a resistance as prompt and steady as that which resulted in our independence. Liberty, indeed!—the liberty of having one's throat cut, and of the ostracism!

Yet, as a frame of government, the absolute sway of Prussia is not to be preferred to the limited monarchies in its neighborhood. The mere fact of the superior intelligence and prosperity of its inhabitants, proves the wisdom and benevolence of its rulers, but is not an argument for an autocratical government.

It may, however, be justly affirmed, that the maintenance of free principles, and their ultimate establishment, even to the banks of the Vistula, do not solely depend upon the British and French monarchies, more free as they nevertheless are, in theory at least, than either of the other European powers.

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It is in vain for philanthropy and poesy to call upon statesmen who are entrusted with the interests of nations, to embark in magnanimous projects for the welfare of the human race. The fanaticism which led the rugged hosts of Latin Europe to desert their families and homes, and perish for a supposed religious duty amidst the sands of Syria, cannot now be excited in the bosoms of their descendants, either by the incentives of glory, of philanthropy, or of religion. Cervantes, by his inimitable ridicule, demolished individual knight errantry, even in his day, and mankind have acquired, by bitter toil in the rocky field of experience, too much good sense to revive, at this period, the Quixotism of nations. No: foreign force cannot render a nation free; nor in the view of reason and reason's God, is that ruler guiltless, who leads the nation allotted to his guidance, into the perils and disasters of war, for the dubious purpose of emancipating a stranger people. If he were, where would be the limit of his interference? A cause of war would always be ready to justify aggression, and that, forsooth, in the name of humanity! The principle of non-intervention in the internal concerns of nations must be sustained, or the zealots for creeds and reforms of every description will substitute for the social system, an unceasing anarchy, and legalize interminable war. Interest, good sense, and humanity will, notwithstanding, leave the tribe of enthusiasts to the harmless pursuit of their dreams and rhapsodies.

But there are other, and, of themselves, sufficient causes, why Great Britain and France will not summon the nations to a crusade of emancipation. Can they? The national debt of the British Government, alleged during the prodigal sway of Pitt, to be the strongest assurance of its stability, may have tended to bind its institutions together up to this time, but if augmented by another general war, will, in all probability, crush, under its colossal weight, that which it is expected to preserve. With respect to this debt, we must reason from probabilities, for there is no experience in history. It is true that the embarrassed state of the finances was one of the most obvious and readily managed reasons for the French revolution; but it

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was, probably, not of itself adequate to the production of that event, because it was by no means beyond the actual capacity of the nation to discharge. The other and more degrading grievances, which had for ages been inflicted upon a great people by its criminal and profligate nobility and clergy, were alone sufficient to cause, if not to justify, even the excesses of Robespierre. But the passions of the British people are not so easily inflamed as those of the French, nor are they so quickly allayed; and it may therefore require the lavish expenditure of an unnecessary war, to goad them into actual rebellion. Rebellion is however feared, and will, if it can, be avoided: for every one is sensible, that if it does come, it will not be a brilliant and momentary conflagration, but an intense, purifying, and irresistible fire. The interest of the debt is to be paid, or the sponge must be applied to the principal. The yearly expenses of government are enormous in time of peace, and with the interest of the debt, render the taxes, if we may believe intelligent men of all parties, quite as great as the nation can well pay. Already some of the radicals suggest the scheme which was in the mouth of every one at the commencement of the French revolution, (and was subsequently carried to a certain extent into effect,) of declaring a *national bankruptcy*. The consequences of such an event can scarcely be conjectured. If the taxes are now so onerous; if such a procedure is now gloomily brooded over and indistinctly hinted at, by a brave, sedate and loyal people, what may not be expected in the shape of an appalling and overwhelming revolution, when in the midst of their bitter and hopeless penury, they are required by a Quixotic ministry, to pay additional millions for the purpose of raising the lazy Italians, the timid Belgians, or the priest-ridden Spaniards, to a state of freedom which they are unable, by education and habit, either to comprehend or to enjoy? Will not reflections such as these restrain the inclinations of the most reckless ministry that could be formed? Would not even the radicals—the Cobbetts, the Hunts, the Humes, should they possibly be placed in office, even if they were inclined to indulge a vague and restless enthusiasm, find themselves com-

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pelled by a necessity which is supreme law, to devote exclusively all the capabilities of the British Government to the interests and necessities of the British Empire.

Nor is France less hampered by its peculiar situation, although, comparatively, free from popular distress. The French, happy as they appear, with their beautiful country; an admirable climate; exulting in their abundant glory; their compact geographical position rendering them, within their own boundaries, a match for banded Europe, has, notwithstanding, too many motives to internal contention for any ministry to venture upon the terrible 'War of Opinion' predicted by Canning. Louis Philippe, timid by nature and habit, but wise enough to discern that his seat is not yet firm, has already given many evidences that he will avoid a general war at any sacrifice short of national dishonor. The *ultra* Republicans who supported his exaltation, have since deserted him on the ostensible ground of his peaceful policy. They urged him to become belligerent in favor of the Poles and the Italians. But they had a deeper motive, and he knew it, than mere philanthropy. A war for *liberalism* once entered into by France,—and the *tri-color* at the Tuilleries would no longer float over a throne. The unintelligible dignitary, a *citizen-king*, would receive his discharge; popular enthusiasm, capable in that country of removing mountains, would reinstal the republic; and some new Carnot would arise to 'organize victory.'

Nor is it to be inferred, that if the ultra-liberals were in power they would incur the responsibility of such a war: since there are three other powerful and adverse parties (the Napoleonists, Moderes, and the friends of Henry 5th) who would readily seize every opportunity to thwart the measures of those in office, if inconsistent with their own interests.

These circumstances, thus rapidly alluded to, and innumerable others of inferior weight, distinctly indicate, that if the much-talked-of 'War of Opinion' for the establishment of liberal institutions throughout continental Europe, is about to ensue, the French and English governments have neither the inclination nor the requisite power to

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maintain the contest. That they may be driven by peculiar and unforeseen occurrences into hostilities, is not impossible; but they, as well as their probable antagonists, will be easily pacified by mutual concessions, long before the PEOPLE stand up with arms in their hands, (as, sooner or later, stand up they will) and ring the regenerating hourra of Liberty from the Guadalquivir to the Neva.

And when that emancipating cry is heard among the nations, where is the leader to be found, at once vigorous and strong; enthusiastic and enduring; foreseeing all consequences, anticipating all obstacles; understanding the true object of the contest, and knowing the sacrifices necessary for its attainment; competent by weight and strength of character to guide the liberals of all Europe to a permanent, reasonable, and constitutional freedom? *Prussia is that leader.* Start not, gentle reader! ponder the subject well, and you will perhaps agree that this answer is neither unreasonable nor visionary. Nothing has been said to disparage the liberal institutions of England, France, Bavaria, Holland, Wirtemburg, Baden, Switzerland or Sweden. It is cheerfully conceded that the people of those countries, as well as of others, such as Spain, Italy, &c. which are yet under despotic rule, are making great advances towards the understanding of that sort of freedom which is indispensable to the well-being of nations. They are getting by degrees to perceive that the French dogma, that '*for a nation to be free it is sufficient that she wills it,*' is a delusive and pernicious absurdity. It comes sufficiently near to a precise and intelligible doctrine, to stimulate the imagination and whet the ferocity of the *Parisian poissardes* of 1792, and would of itself prove, if the bloody records of subsequent years had not rendered such proof unnecessary, that the French nation at that time had no correct ideas of the elements of civil liberty.

Whensoever the people of Europe shall have emancipated their minds, the emancipation of their bodies will follow as inevitably as day succeeds night: but unless they accomplish *that,* they may imitate the example of the South Americans, and '*Will*' themselves free every six

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months, and yet remain bondsmen, or become worse, to wit—implacable and assassinating anarchists. A form of government from the '*pigeon holes*' of Abbe Sieyes, or some other theoretical lawgiver, will not, no matter how solemnly soever it may be enacted into the supreme law, convert an ignorant into a free people. The fitness of things requires that the organic law should be suited to the spirit and character of those who are to live under it: and it would not be more unreasonable to give the charge of a china shop to a dozen monkies, than to set a headstrong, unthinking and uninformed people, to manage the administration and superintend the complicated machinery of a free representative constitution.

But the enquiry will be made, how it can be possible that Prussia, the most absolute of monarchies, which derived its existence as a great nation from the sword, and yet maintains its international importance by a vast army, can be expected under any circumstances to become the head of European liberalism? Those who think that what has been must be again; who suppose that a nation which pursued a certain policy one hundred years ago, must pursue that policy now, will deem this unanswerable. But he who can discern the *future result* from the *present cause;* who, when he perceives the *seed,* can picture in his mind its gradual expansion to the developement of the inevitable flower, will see nothing incompatible in the apparent absolutism of Prussia now, and its actual liberalism hereafter. Liberal in spirit, it indeed is at this moment. More so than France—not, indeed, so anarchical; not so revolutionary; neither does it discourse so eloquently, so pertinaciously of the rights of man—of the glory of the nation—of the perfectibility of the human race—of citizen-kings, monarchic republics, and all the other whim-whams which men ravenous for notoriety are incessantly dinning into the public ear. It prefers the cultivation and exercise of practical common sense to the discordant mass of dreamy philosophy, gasconading republicanism, rebellion without object, and submission without excuse, which has bestrode the hobby-horse of a visionary Liberty, until it has almost rendered the very name of liberty ridiculous.

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But the idea of real liberty is not ridiculous. It is the inevitable result of a certain cause—and *that cause only* can produce it. Let the aggregate mind of a people, numerous enough for the protection of their sufficiently extensive and productive country, be trained and exercised so that all its capabilities are brought forth to their full size and strength, and are adequate to that prompt perception and consentaneous action, which make millions an unit, and Liberty bursts into being, armed, full grown, and exulting, as the fabled Pallas of antiquity sprung from the head of Jove.

Here—in North America—we have, thank our God, an example and a proof. Our liberty is the offspring of mind, not of victorious battle. Renown and gratitude—immortality of fame—the loftiest place in the pantheon of earthly glory, belong to the Franklins and Washingtons of the Revolution. But our secure freedom did not germinate in their minds, nor in their actions. They were themselves the creation of its parent—and that parent was the broad, educated, *amalgamated* mind of the thirteen colonies—the 'CONTINENT.'

When therefore you begin the process of emancipation by imposing a scheme, plan, or constitution of freedom upon an ignorant people, by eloquence or the sword, you begin where you should end. You endeavor to make the effect produce the cause. Sieyes, Condorcet, Bailly, Brissot, all able men, made constitutions of government which would have answered very well provided men were angels; but unfortunately they were for the use of mere men—and those men Frenchmen of the last century—the same kind of Frenchmen who, during the extraordinarily long reigns of Louis 14th and Louis 15th, lived under, and sometimes exulted in, the most personally degrading, ignominious, and contemptible rule to which man ever, in Europe, bowed his head or bent his knee. And the philosophers, theorists, and orators, the Condorcets, Rolands, and Vergniauds, attempted to take this people from the depth of their degradation and submissiveness, and, without any intermediate stages of progressive intelligence and experience, lift them at once to the loftiest condition which

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congregated men can attain—that condition of conventional equality which results from self-government. The consequence is in history—a consequence full of instruction and of woe.

The Prussian dominions, when the grandfather of Frederic the Second assumed the title of King, situated in the north of Europe, were perhaps poorer in resources, with an inferior soil and a more rugged climate, than any other considerable portion of the Germanic body, with the exception of Hanover. His predecessors had been content with the inferior title of Elector, and Europe was amazed when his preposterous vanity induced him to take the regal designation; so unsuitable did it seem for a potentate intrinsically feeble. His extraordinary son, a queer compound of littleness and greatness, intent upon vindicating his right to the high rank which vanity had bequeathed him, devoted his energies to the improvement of the soil and population of his dominions; sought by every means in his power to impress upon his subjects a homogeneous character; to attach them to their country and government; systematizing their industry, exciting their activity, ameliorating their condition; eradicating the remains of feudal feelings, and creating a general animation and vigor, which might, under wise guidance, render Prussia at no very remote period, a counterpoise to the then undoubted pre-eminence of Austria. To guarantee the safety of his realm, and prevent the jealousy of his neighbors from rendering his great efforts abortive, he fostered his military force; and, by a peculiar rigidity of discipline, and incessant and laborious instruction, his army came to be the best trained, and, for its size, by far the most efficient upon the continent. It is true that he paid little or no attention to what are usually termed intellectual pursuits; but his neglect, instead of being a fault, is rather a singular proof of a sagacity superior to his times. He had himself no leisure for philosophy, poetry and the fine arts—probably no taste for those pursuits. He saw clearly, however, that those should be the last among the objects of a good king, and were to be regarded only as the Corinthian capital of a great nation. For the period of

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his life, he knew that he would have sufficient employment in infusing into his inactive and uninformed subjects the energy and consistency of character, which alone could ensure the mighty end which he had in view; without which, the establishment of academies of sciences and arts, dissertations on philosophy, rhetoric or politics, though they might minister to his vain-glory, would be worthless to the nation. If his hazardous and somewhat doubtful project, of founding a mighty empire out of a parcel of disjointed states without natural or artificial defences, should succeed, he had little fear but that all the elegancies and refinements of civilization, intellectual and otherwise, would come in their proper time. At length, in 1740, he died—in peace with all the world, having in a great measure, effected his objects; leaving a rich treasury, an admirable army, and between two and three millions of subjects to his son.

That son, FREDERIC the SECOND, then near thirty years of age, had never had an opportunity for the public exercise of his capacity; for his father had not entrusted him with any business beyond the mere command of his regiment. He had himself, however, subjected his mind to a severe discipline, which fitted it for the conception and accomplishment of great deeds.

He had observed the dangers and advantages of his position. His father had left him peace; but with it, a national policy which was progressive, incessantly advancing its strength, bearing onward to a greatness which was fearfully and distrustfully anticipated by the older monarchies. Frederic adopted the policy, and he could not safely avoid it; and the plan conceived by the uncultured mind of his father, was developed by his amazing genius during a long reign, the most remarkable, perhaps, of which history bears any record; extreme in its reverses; almost miraculous in its victories; and leaving, at its close, the Prussian monarchy vigorous, consolidated, on an equality with the first powers of Europe, and ambitious for the highest rank in physical and mental power.

It may be amusing to speculate upon what would have been the probable career of Frederic, if his father had not, throughout his whole reign, strictly adhered to his peculiar

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policy. History gives us no similar character to that of Frederic William, and it is possible that one widely different would not have been able to have achieved what he did. Even his very failings probably contributed to his success. A brilliant monarch like Frederic, devoting himself so intensely to the extension of his power, would have alarmed the neighboring cabinets. But while he was seriously at work, Europe was laughing at his tall regiment, and his odd project of creating a race of Titans in his dominions. People ridiculed his foibles, and condemned his excesses, without perceiving that under their cover, he was quietly laying the foundations of national greatness. It is probable that his strong mind did not see very far forward into futurity, but was simply conscious, both from example and reason, that the policy he adopted was essential to the welfare, and perhaps the existence of his kingdom. Such a conjecture is the more probable, from the fact that he discountenanced those pursuits of his heir-apparent, which were calculated to form and improve his mind for a great and splendid reign.

Whatever credit for foresight we may award to Frederic William, there can be no doubt that Frederic was especially, and beyond any man of whom we have any knowledge, qualified to take the nation where his father left it, and make it prosperous beyond the wildest dreams of enthusiastic imagination. On his acession to power, he imposed it upon himself as imperative, that all his capacity was to be used for Prussia; that pleasures, studies, even comforts, were to be abandoned for her service; that her prosperity was his; that it was not only his duty to render her glorious, wealthy, and powerful, but that the meanest peasant was to have his rights protected and his industry encouraged; and that he, the king, was personally bound to be accessible to all descriptions of his subjects, and to elevate, so far as he could, their moral and intellectual character. Never king before imposed upon himself such a law, and with scrupulous and indefatigable fidelity, did he in battle and in the cabinet, obey its requirements. No law ever was by any man, or any description of men whatever, not even religious forms by the most strict of secta-

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rians, more punctiliously obeyed, than was this rule of self-government by him who enacted it.

His very pleasures, if we except his fondness for the canine race and love of the table, were subservient to his duty, and those exceptions were never permitted to interfere with it. His leisure moments were passed in the cultivation of literature and science, and the society of learned men, who, in return for his protection, aided in the dissemination of learning throughout his possessions. The exigencies of his situation required an exceedingly rigid discipline in his troops; but they were less odious to the people than those of any other nation, and entertained for his person an exceeding love and veneration. He reformed the law, and made it suitable to the character and wants of his people. He established and encouraged manufactures, and regulated the imports, from which a chief portion of the revenue was derived, so as to give his subjects advantages over their neighbours. Large tracts of desert land were colonized, and bounties and stock furnished to the colonists at the national expense, in order to promote population, and the improvement of all his territories. Schools were established to the utmost extent of the national means, and, with the view of accustoming his people by degrees to the exercise of freedom, he would not allow the magistrates and clergy to impose schoolmasters and preachers upon the parishes without their consent; insisting that the people should have their free choice, provided they selected persons of pure morals and sufficient acquirements. He made himself the example of a regular but not parsimonious economy: and to all officers, civil and military, he allotted a fair compensation, but nothing for unnecessary display: teaching by example as well as precept, that the responsibility of an office and the correct discharge of its duties, were enough to render it respectable. He had no great Lords about him, and taught the single-minded Prussians to discourage the breed: he patronized no declaimers upon the necessity of patriotism, but dispensed with the preaching and favored the practice of that virtue. Unlike his salacious cotemporaries, Louis XV. George II. Francis I. and Augustus of Saxony,

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though he loved and enjoyed, (as they did not) the Muses, he had not the inclination, or if he had, he repressed it,

> 'To sport with Amaryllis in the shade,
> Or with the tangles of Neæra's hair.'

His was, therefore, not a Court for women and their blandishments. Europe had for ages been cursed with sovereigns who made a business of pleasure, and were consequently, more or less under the government of the female sex. Government he regarded as a laborious occupation, with which what are termed pleasures have no connexion, and over which women should have no influence. Instead, therefore, of devoting any part of the revenue to those sumptuous establishments of mistresses and their retinue, which in other countries blocked up the avenues to the monarch's ear, and sanctioned immorality by the highest example, Frederic made his court a workshop, in which he was the chief laborer, and gave to the people far more than an equivalent for what they paid for its support.

Those countries, which, during the course of his reign, were added to his dominions, though not in every instance rightfully obtained, were vast gainers by the change of masters. Whole districts which war and bad government had impoverished and desolated, were assiduously cherished, and rapidly elevated to an equality of prosperity with his patrimonial domains. Ruined hamlets and villages were repaired for their miserable inhabitants: Canals were dug; roads and posts established; marshes were drained; all sorts of mechanics were encouraged and dispersed whereSoever they were needed; education was introduced into provinces where, formerly, the multitude were the brutified serfs of the nobility: justice was dispensed to all alike at convenient places, and the magistrates being responsible directly to the sovereign alone, all interference by the wealthy, by nobles or by priests, was avoided, and Prussia became the only country on the continent where the people were secure in the enjoyment of any of their rights.

It is to be observed that Frederic retained until his death, and transmitted to his successors, the rank and power of Autocrat. He was, therefore, according to the

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creed of a certain class of visionaries, a tyrant, an oppressor, deserving the execration of mankind. He should in their opinion have given his subjects a constitution: have recognized the 'rights of man;' and allowed them laws of their own framing. Frederic, however, although a poet, philosopher and musician, was no visionary. If he did not foresee the period when liberty would be established in Prussia, he was aware that the time would come, when the Prussian people would make an effort to obtain it. Fit for it in his reign, they were not; nor were they in that condition, personal and political, in which every nation should be. To have given them the forms of a free government, would have been a bequest of misery, crime and desolation, with hardly a glimmer of hope in the far-off back ground. Therefore it was, that he employed his magical genius in elevating them to that high standard of reason, virtue, and strength, in which liberty can be enjoyed and not abused; and instead of being the most horrible of evils, be, as it now is in the United States, the greatest of all blessings.

We have now no space to make all the reflections which occur: and perhaps the chief effects of the reign of Frederic have been sufficiently indicated. His nation now is perhaps more thoroughly educated than any other; and a greater proportion of its youth, it is believed, are instructed in the higher departments of learning, than those of any other country. That liberty will be ultimately obtained by the Prussians, cannot be doubted; for it is the child of a thorough civilization. *It is the natural product* of the policy of FREDERIC THE INTELLECTUAL, whose name, it may safely be predicted, will arouse more enthusiasm through the ages of progressive civilization that are to be hereafter, than that of Alexander, of Cæsar, of Napoleon.

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TELEGRAPHIC LANGUAGE.

[Extract from the Hon. John Pickering's Lecture on Telegraphic Language, delivered before the Boston Marine Society.]

[CONCLUDED FROM PAGE 121.]

THUS far we have directed our attention to the utility of telegraphic communication with respect to the practical concerns of our commerce; and this, undoubtedly, is of the highest importance, because it immediately concerns the preservation of human lives.

But the application of the art to other subjects will naturally follow the progress of those rapid improvements which are believed to be characteristics of the present age. If, for instance, we take the case of commercial affairs in general, we know what a change has taken place in the transmission of intelligence relating to business within a few years past; and it would seem, too, as if every new impulse in business rendered it necessary to add new energy to our means of communication.

Is it too much to suppose, that the demands of business may before a long time, lead to the establishment of telegraphic communication between our principal cities? Twelve years ago it was stated in the French papers, that three thousand messages could be conveyed in one day from Paris to any extremity of France, and that answers could be received to them. Even since I have been preparing to meet you at this time, the question has been agitated as to the practicability of a telegraphic line, for purposes of business, between the great seat of our northern manufactures and this city. And why may we not look forward to the time, when there shall be such a communication between this city and New York, Philadelphia and Washington? I dare not presume to predict such an event for some time to come; and yet when we daily witness the extraordinary resources of this growing country, when we observe the wonderful results of an intelligent and active population, incessantly occupied in developing their powers and resources—and stimulated by the circumstances in which they are placed, to greater and more

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intense exertion than the same number of people have probably ever been,—when we see too, that all ordinary calculations, founded upon the precedents of other nations, fall short of what is here actually accomplished,—when we witness all this, we cannot believe that it is being too sanguine, to expect the application of the telegraph to a vastly greater extent than we have yet seen. Will it be said, that the demands of business will never be such as to warrant the adoption of it, for instance, between this city and New York? For want of practical knowledge, I dare not affirm that this will very soon be the case; and yet, if there are now essential advantages to business in obtaining intelligence from New York in two days, or less, or at the rate of eight or ten miles an hour, any man can perceive that there may be a proportionate benefit, when we can transmit the same information for that distance by telegraph at the rate of four miles in a minute, or in the space of a single hour, from New York to Boston.

Let us take as an example, by way of illustrating this view of the subject, the case of the great questions now agitated at Washington, and in which the welfare of the country is so essentially involved. Might it not prove to be of vital importance to thousands of our men of business in this quarter of the Union, whether friendly or adverse to the tariff, to be able to know the decision of the government at Washington, in two hours and a quarter after that decision was made? Why do we annually see such extraordinary efforts made, to transmit the message of the Chief Magistrate, and other state papers and public acts of the Government, through all parts of the country? How is it that even the rapidity of the public mail is not sufficient to satisfy the demands of a business community, and we, therefore, see the editors of our newspapers, at an enormous expense, establishing private expresses to convey intelligence from the seat of Government to our principal cities? It is because the measures of the Government are of vital consequence to the business, as well as to the political rights of the citizens. When, therefore, we find by actual experience, that this rapid mode of communi-

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cation is deemed necessary to the wants of an active community, who will venture to set bounds to its application? We can, in imagination, suppose it to be extended on our coast, from one end of the Continent to the other; and if any people shall ever carry it from our Atlantic shores across the Continent to the coast of the Pacific ocean, I feel the strongest conviction, that it will be accomplished by our countrymen; when we may obtain intelligence from China in as short a time as it now reaches us from Europe!

Nor will telegraphic language be confined to one nation; but being founded, as you have seen, upon the basis of the numerals, which are almost a universal written language, telegraphic signs become more easy than any other to be adapted to the different languages of the world. A Frenchman, for instance, by adopting this system will be able to converse with an Englishman; and the reverse; as each of them will have his dictionary of numbers, the common language of both, explained in his own tongue; while, for the purposes of private intercourse, each nation may have its own secret signals or characters.

But I forbear to occupy your attention any longer with speculations on our brilliant prospects of the future, however they might be justified by actual results of the energetic and enterprizing character, and the inexhaustible resources of our nation. Speculations on the progress and ultimate destiny of nations, even though founded on the most comprehensive views, are too often falsified by circumstances beyond the reach of human sagacity. A great statesman has observed, that it may well be doubted, 'whether the history of mankind is yet complete enough, if ever it can be so, to furnish grounds for a sure theory on the internal causes which necessarily affect the fortune of a state. . . . . We have seen States of considerable duration, which for ages have remained nearly as they have begun, and could hardly be said to ebb or flow. Some appear to have spent their vigor at their commencement. Some have blazed out in their glory a little before their extinction. The meridian of some has been the most splendid. Others, and they the greatest number, have fluctu-

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ated and experienced at different periods of their existence a great variety of fortune. At the very moment when some of them seemed plunged in unfathomable abysses of disgrace and disaster, they have suddenly emerged. They have begun a new course and opened a new reckoning; and even in the depths of their calamity, and on the very ruins of their country, have laid the foundations of a towering and durable greatness. All this has happened without any apparent previous change in the general circumstances which had brought on their distress. The death of a man at a critical juncture, his disgust, his retreat, his disgrace, have brought innumerable calamities on a whole nation. A common soldier, a child, a girl at the door of an inn, have changed the face of fortune, and almost of nature.'*

Amidst all these uncertainties, however, in our speculations on the moral and other causes here so powerfully described, which baffle the most careful reasoners and confound the wisest statesmen, it is of the highest moment, as the same great man observes, 'to distinguish things of accident from *permanent* causes.' In the case of our own country, if there exists any one of the 'permanent' causes here spoken of—if there be any one principle from which we may reason without hazard of error, it is this, that our future greatness and prosperity, as a people, essentially depend upon our continuing to be a *united* people—*one nation*. Unhappily, while we had hoped to be now indulging ourselves in the delightful anticipations of the future which flow from this source, events are taking place in another part of our country, deeply affecting our national union and tranquillity. But let us not despond; let us still hope, that the great questions which now agitate the country, will yet be decided by the tribunal of reason, and not of passion or force; that the same beneficent Providence, which first united us under a common bond of national attachment, will tranquillize the present commotions; and that every member of the national family

* Burke's Two Letters on the Regicide Peace.

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will continue to feel that we shall owe the duration of our unexampled prosperity, as we did its beginning, to the preservation of the UNION.

NOTE.

Account of the improved Telegraphic System of the Greeks; extracted from Polybius's History, Book x. ch. 46. (B. C. 203.)

The last method which I shall mention, was invented either by Cleoxenus or Democlitus, but perfected by myself. This method is precise, and capable of signifying everything that happens, with the greatest accuracy. A very exact attention, however, is required in using it. It is this which follows.

Take the twenty four letters of the alphabet, in order, and divide it into five parts, with five letters in each. In the last of these parts, indeed, one letter will be wanting; but this is of no importance. Then let those who are to give and receive the signals, write upon five tablets the five portions of the letters in their proper order; and concert together the following plan. That he, on one side, who is to make the signal, shall first raise two lighted torches, and hold them erect, till they are answered by torches from the other side. This only serves to show, that they are on both sides ready and prepared. That afterwards he again who gives the signal shall raise first some torches upon the left hand, in order to make known, to those on the other side, which of the tablets is to be inspected. If the first, for example, a single torch; if the second, two; and so of the rest. That then he shall raise other torches also upon the right; to mark in the same manner, to those who receive the signal, which of the letters upon the tablet is to be observed and written. When they have thus regulated their plan, and taken their respective posts, it will be necessary first to have a dioptrical instrument, framed with two holes or tubes; one for discerning the right, and the other the left hand of the person who is to raise the torches on the opposite side. The tablets must be placed erect, and in their proper order, near the instrument. And upon the right and left, there should be also a solid fence of about ten feet in length, and of the height of a man: that the torches, being raised along the top of these ramparts, may give a more certain light; and when they are dropped again, that they may also be concealed behind them. When all things then are thus prepared, if it be intended, for example, to convey this notice; 'that some of the soldiers, about a hundred in number, are gone over to the enemy;' it will be necessary, in the first place, to choose words for this purpose which contain the fewer letters. Thus if it be said 'Cretans a hundred have deserted;' the same thing is expressed in less than half of the letters which compose the former sentence. These words, then, being first written down, are com-

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municated by the means of torches in the following manner. The first letter is Cappa (C); which stands in the second division of the alphabet, and upon the second tablet. The person, therefore, who makes the signal, first holds up the torches upon the left, to signify that it is the second tablet which is to be inspected; and afterwards five upon the right; to show that Cappa is the letter, which he who receives the signal must observe and write. For Cappa stands the fifth in the second division of the letters. Then again, he holds up four torches upon the left, because Rho (R) is found in the fourth division; and two upon the right, to denote that it stands the second in that division. From hence, the person who receives the signal writes Rho (R) upon his tablet, and, in the same manner all the rest of the letters. By this method, an account of everything that happens may be conveyed with the most perfect accuracy. It is true, indeed, that, because every letter requires a double signal, a great number of torches must be employed. If the necessary pains, however, be used, the thing will be found to be very practicable. In both these methods it is principally requisite, that the persons employed should first be exercised by practice: that, when a real occasion happens, the signals may be made and answered without any mistake.

Having given the substance of Mr. Pickering's lecture on telegraphic language, we have annexed *a fac simile* of Mr. J. R. Parker's Semaphoric Telegraph, as well as the Marine Telegraph Flags, in a plate at the end of the present number, wherein is exhibited a practical exemplification of a telegraph communication, as contained in the United States Telegraph Vocabulary; a second edition of which, we understand Mr. Parker is preparing for the press; comprising twenty thousand words, phrases and sentences, applicable to telegraphic purposes, and upon every subject, together with the designating numbers of nearly fifteen hundred American vessels, which have adopted this system of telegraphic communication.

We understand that the Navy Department of the United States have lately been furnished with sets of the Marine Telegraph Flags, and a designating number and a signal book for each vessel, which will enable the Government vessels and Revenue Cutters to hold communication with our merchantmen in every section of the Union, as well as to communicate with the several telegraph stations upon our coast.

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[Furnished for the Tracts and Lyceum.]

QUADRATURE OF THE CIRCLE.

'What was once
Incontrovertible is overthrown;
And what now seems built on the base of truth
Perchance shall pass as stubble, which the fire
In one full blast consumes.'

In the Tracts and Lyceum for Jan. 15th, I observed an article with the signature of 'S.' on the quadrature of the circle, wherein some things appear well said, and some, manifestly, for the purpose of burlesque and ridicule. The allegation that the solution of this problem must, in reality, consist in turning a ball into a cube, or a cube into a ball, is a more happy definition than those generally given, which, generally, only go to give us the idea of turning a circle into a square, or a square into a circle of the same area. But assuredly, if the circle may be turned into the square, the ball can also be turned into the cube.

But Mr. S.'s following similitudes are rather gratuitous, and do not at all serve as preliminaries to the discovery of the true quadrature; or to make its valuation the every-day amusement of the schoolboy. The writer might have gone still further with his true definitions, and might have said, that the discovery of the quadrature would be nothing short of the ne plus ultra of numbers—the perfection of the admirable method of numbers by fluxions, reducing all flowing quantities, with their maximum and minimum, to a geometric certainty, always resulting in assignable roots and powers. Nay, farther; that by the institution or adoption of a system of nascent ratios, the exertions of nature at extension, *without* its actual or assignable production, might be as clearly shown to the mind, as when extension is apparent or assignable. Then, may the schoolboy be employed in deducing the true result of the quadrature, in almost an infinite variety of processes; either by chopping off, as Mr. S. would call it, or as M. Legendre would say, by the law of continuation,—or by other processes, not in any-wise connected with the approximating modes, but by one grand and agreeable result of the mind,

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by which means, such school-boy might imbibe quite different views respecting dynamics, and the mechanism of the heavens, (at least, in their explanations,) from those already given.

Now Mr. S. seems determined on goading up some external *sense* of a certain Mr. Thompson, (with whom I am wholly unacquainted, but whose champion I am,) who seems to have declared himself the discoverer of the quadrature, and seems determined on compelling him to come forth with an explanation to the world, and that too, in the Tracts and Lyceum; as though it were to consist of some one or two geometrical diagrams, or an algebraic or fluxionary formula. But let Mr. S. be assured, (in behalf of Mr. Thompson or any other person) that a proper solution of the quadrature can never be given to the world, short of a whole new system, or dispensation of the economy of numbers, based upon an appropriate symbolic language; and that even a fair synopsis, would probably contain some hundreds of pages, without the encumbrance of a single diagram, (which, by the way, would be of no possible use in the solution).

But Mr. S. has not informed us to what notice of Mr. Thompson he refers: whether it be the one which appeared in 1826, in no less a public print than the paper called Coram's Champion, in which I saw it over the signature of G. H. Thompson; wherein he says, that 'by the divine assistance,' he was induced to announce to the world his discovery of the quadrature, which he had made by means of the Plane Sliding Sector, &c., and which notice was then answered by D. Gould, Esq. then and now, of Boston—or whether it be a more recent circumstance, when Dr. Wilbur Fisk was called in by Mr. Thompson, and some of his friends and patrons, to examine Mr. Thompson's diagrams upon the quadrature, that Mr. S alludes to, or to some still more recent notice in the public prints, of which I am wholly ignorant.

But Mr. Thompson has doubtless learned by this time, that any attempt to give the world his new and better dispensation, is rather an unwelcome task; and that any attempts to introduce it, are only scoffed at and ridiculed; and

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that the world has taken to itself a faith, which even his better dispensation cannot eradicate.

But surely Mr. Thompson is entitled to approbation for his perseverance—his attempts are not ephemeral, like those of Mr. Feldt, Mr. Woodville, the Irish boy, &c. No; he has, as it were, rode out the storm; and is now, doubtless, well anchored in his own assurance—more consolatory, by far, than the applause of a world who know nothing of his vast imaginings: and hence, apprehending that he will not deign to relieve the doubts of Mr. S., by giving explanations, 'though thick as blackberries;' and in case of his failure, having supposed such explanation might as well devolve upon me as on anybody, I have come forth as his champion: not as an Archimedes redivivus, with brawny limbs and grisly beard, moving the world *without* a place to stand on, as Archimedes has done for two thousand years, respecting the quadrature,—but as the philosopher of the forest, directly from the field of nature; not from the trodden graves of ancient colleges and halls, where all ideas are circumscribed within certain fixed bounds—where all must travel within a circle, the ratio of whose diameter to its circumference is as 1 to 3.1416, &c.—but where our sphere of action (and thinking) is either enlarged or diminished, as fancy may dictate. And although the hill of science is not at present situated wholly in the field of nature, yet I can inform Mr. S. that the field of nature is not destitute of the requisite materials from which the sciences are to be drawn; and who knows but that Mr. Thompson is one of nature's children, and has long cultivated her field, and has seen her vast stores; for,

> There is her Time, which nothing can control—
> There is her Space, in which her systems roll;
> There is her Matter, either dense or rare;
> There is her Motion, and her Form is there;
> And there her Number—there her point and line,
> Which Form and Motion, Space and Time define.

But to the explanation of the quadrature which Mr. S. asks at the hands of Mr. Thompson, (now devolving on me). And here I will presume that Mr. S. knows as well respecting the symbolic language, by which the true quad-

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rature is to be expressed or determined, as he does respecting the true solution. Hence I shall satisfy myself for the present, by giving him the *prime* formula, from the book of Rational Analysis, (which alone contains the true solution) together with such explanation as I think necessary on the present occasion. But, as a preliminary, let D denote the diameter of a circle—F, $\frac{1}{4}$ of the circumference—G, one side of the inscribed square, and I, the radius; let $\frac{1}{1}$ denote the difference between G and F—let $\frac{1}{2}$ denote a rational $\frac{1}{4}$ of the difference between J and F—and let $\frac{1}{3}$ denote the rational $\frac{1}{2}$ of the difference between D and F—thus denoting either known or assumed differences between certain linear quantities of the circle. The prime formula is thus:

$$\frac{1}{1}\,\frac{3}{1}\,\frac{1}{2}\,\frac{1}{1}\,\frac{1}{2}\,\frac{2}{1}\,\frac{1}{3}\,\frac{6}{1}\,\frac{1}{4}$$

by the aid of which, not only the true quadrature is to be developed, but also those exertions of nature at extension where no assignable extension is produced; and, to this end the formula may be extended, (or rather intended) to any required number of characters we please. And now I will inform Mr. S. that by the help of said formula, in connection with others suitable to the purpose, the true quadrature *may* be deduced, by a great variety of evolutions, as he can testify, if he will take the trouble to go through with the proper processes. But after all, he will find the diameter and circumference as incommensurable in the first powers, as are the diagonal and side of a square; whose ratio is not susceptible of a definite expression by our numeral figures. But if Mr. Thompson, or any other person, will show their commensurability in any of the higher powers, *they will confer a benefit on mankind far transcending what the most enthusiastic have yet conceived would result from a perfect solution of the quadrature of the circle.* A. Y.

Craftsbury, (Vt.) Jan. 28, 1834.

☞ Nota Bene.—The compositor cannot find any types with which he can figure Mr. A. Y.'s formula precisely, but he has done

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as well as he was able; and after poring over the pages of the most celebrated mathematical works, we have been unable to find any such kind of expressions. We have therefore concluded that our correspondent, in his haste, made some mistake in writing his formula, as we certainly believe him to be a gentleman of mathematical attainments.

We hope that either Mr. A. Y. or some other person, will favor us with an explanation of this magic formula, which Mr. A. Y. informs us is possessed of such wondrous power.

BOSTON HIBERNIAN LYCEUM.

A Society has lately been organized in this city, under the name of the 'Boston Hibernian Lyceum,' whose object is the elevation and improvement of that class who are either natives of Ireland, or of Irish parentage.

Its projectors being aware of the prejudices which now exist towards the people of that unfortunate nation, have endeavored to unite the services and assistance of the young men of that country, which is their adopted home—that thus their combined exertions may be secured to elevate and improve the rising generation in all that may serve to remove that prejudice, and make them useful and virtuous members of society. The following circular is now published in furtherance of the object—confidently anticipating that their laudable exertions will be seconded and approved by an enlightened and generous community.

TO THE GENEROUS PUBLIC.

The undersigned, a Committee appointed for the purpose, respectfully beg leave to call your attention to a Society of Young Men recently organized in this city, under the name of the Boston Hibernian Lyceum, for mutual improvement in the various subjects deemed deserving the attention of its members, and calculated to aid in qualifying them for the important responsibilities which, as members of an enlightened community and supporters of a free government, they will soon be called to assume.

Aware, from the general expression of public sentiment, of the confidence entertained in the utility of similar associations, we deem it unnecessary on this occasion to urge their claims to your support.

While, however, we feel a pride in acknowledging the success of cotemporary associations, we regret to say that many of our countrymen withhold their aid and influence under the mistaken idea of inequality, or want of confidence, and an unfortunate, but prevailing opinion, that their fellowship is not desired.

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This Society had its origin in the conviction, that another added to the number already successfully maintained, designed to address itself more particularly for its interest and success to the class of young men who may feel themselves embraced in the name under which it has been organized, might become extensively useful in affording opportunity for social intercourse with young Americans, and uniting the services of those who wish to assist them in diffusing a taste for improvement among its members.

Its past success and increasing prosperity have afforded happy confirmation of our hopes.

To encourage a taste already awakened, this society has commenced the collection of a small Library of Books, Periodicals &c., to which it is designed each member may have free access.

From the desire, however, of bringing it within the power of every young man to join, the whole expense of membership has not been permitted to exceed the average of $2 a year.

The discharge of the necessary expenses of rent, fixtures, &c. &c., have required all our funds, and forbid the hope of being able to appropriate any portion in aid of this object. Unwilling, notwithstanding, to abandon a project designed to aid the cause in which this community are known to entertain a deep interest, they have adopted this method of appealing to the liberality of that portion of the community, whose known character affords sufficient guarantee of the result of their application.

Any further information may be obtained on application to the following gentlemen, to whom they have leave to refer.

MR. JAMES BOYD, 27 Merchants' Row.
MR. JAMES MEANS, 49 India Street.
MR. ABRAHAM HOWARD, 30 Central Wharf.
MR. ISAAC MEANS, 14 Central Wharf.
GEO. S. HILLARD, Esq. 11 Court Street.
REV. JOHN S. STONE, Temple Place.
WILLIAM SULLIVAN, Esq. Court Square.

Boston, Jan. 29, 1834.

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ORIGINAL MISCELLANY.

SCIENTIFIC DOINGS.—So little has been done the last few weeks, that no interesting items have been collected. Whether the removal of the government deposites has had any influence upon the progress of scientific bodies, we leave for others to determine. One thing, however, is certain, viz., that an intellectual poverty is beginning to be manifested. Solar influences are very unfavorable to profound thought, and particularly when the sun shines with summer splendor in the middle of February, as it does at the moment of penning this remark.

GOOD'S BOOK OF NATURE, *Abridged from the original work, and adapted to the reading of children and youth, with questions, for the use of schools*, is no catch-penny affair; and we can conscientiously recommend it to parents. With such a book as this, the young may and will be made wiser and better. In the next number, two weeks hence, a regular semi-monthly review of new books will be commenced, and this work will then be critically analysed.

SAND AT SEA.—The following items are from the notes of a Boston gentleman of our acquaintance, now abroad. If any of our readers will explain to us in a more satisfactory manner than the journalist, certain phenomena, they will much oblige.

OCT. 10, 1833. Lat. 50 N. Long. 30 W. Do you recollect what Byron says, in the Corsair, I think, about the shining of the water in the Levant, in the night? If not, look for it. I never saw it so bright as it is this evening. It is very dark, the clouds are not heavy, the stars overhead shine through them; but about the horizon, it looks like half an hour before a a snow-storm begins. As far as the eye can reach, in every direction, the water shows as many blazes as there are stars in the sky; every ripple on it is a light. There is a good breeze, but not heavy; we have all sail set, going eight knots an hour. When the vessel stirs the water, it is very light. The moon at the full would not give more light on the sails than this does. I can read by it, but it is not steady.

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When the vessel drives into the water, off of a swell, it makes a greater movement of the surrounding water than when her motion is more regular; therefore the light is in flashes. The wake or track of the vessel is seen further astern than in the day-time. The light is not red or glaring, like that of a fire, but silvery, more like the moon. I do not recollect seeing it very bright in high latitudes, except in an east wind, and never in clear weather. It is quite common in the Levant; and once, in the North Sea, I saw it very bright, and read a chapter in a common-size Bible by it. The wind was then westerly.

Oct. 13. Lat. 10 N. Long. 27 W. Did you ever hear of the sands of the African deserts blowing a long way from them? We are now 600 miles west of the most western part of Africa, Cape Verd. Yesterday our sails were covered with sand, so much as to have the appearance of rusty iron, or sails that had been tanned with bark; and all about the yards and masts aloft, it was the same. Last night we had a heavy rain, which washed them clean, so to-day there is not the least appearance of it. I have heard of this before, but had much doubt of it. It must be very fine: we are not sensible of it, until we find the sails colored. We have had a brisk breeze from the east for several days.

Oct. 16. Lat. 10 N. Long. 26 W. We had two visiters from the shore on the 14th,—two common *swallows:* they appeared tired, and would rest a little while at a time, on the yards; but, there being a considerable swell and but little wind, so that when the vessel rolled they lost their equilibrium, they were obliged to fly. They remained with us till night, and then left us: where they went, I do not know. Yesterday, another more unexpected than the former, a *butterfly*. I do not know that the land is within 500 miles. The poor fly must have had a long journey, and a fair wind helped him, no doubt, materially.

Dec. 25. Lat. 12° 40′ N. Long. 48 W. The breeze continues fine and favorable: latitude to-day at noon, 12° 40′. These last two days we have run 380 miles. Flying-fish abundant as grasshoppers in June, at home. The sails are again covered with red sand, as they were on the passage out. We are at least 1800 miles from the nearest point of the African coast. How is it possible that the sand should be blown so far? If it does not come from Africa, whence does it come? The wind here is at all times of the year from the eastward. If it be not sand, what is it? There has never been any other account given for the color of the masts and sails than this;

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and when a rain comes, it is all gone, and the masts and sails are restored to their original color again: nor have I ever heard of its occurring in any other part of the world than this. T.

CHEMISTRY.—What has become of our former correspondents on chemistry? It is quite desirable to know what is doing these days in this interesting science. Since the death of Sir Humphrey Davy, no works of consequence seem to have made their appearance. There is no want of students, however, to keep the present amount of knowledge alive, but it must be confessed, that in this country, at least, a most woful neglect is perceivable among the admirers of this useful department of human wisdom, in concentrating the experience and discoveries of the day.—Any communications on this subject, as advertisers say, will be *thankfully received.*

IMMENSITY OF THE UNIVERSE.—Baron Zach, an eminent astronomer, computes that there may be a thousand millions of stars in the heavens. If we suppose each star to be a sun, and attended by ten planets, (leaving comets out of the calculation,) we have ten thousand millions of globes like the earth, within what are considered the bounds of the known universe. As there are suns to give light throughout all these systems, we may infer that there are eyes also to behold it, and beings, whose nature in this one important particular, is analogous to our own. To form an idea of the infinitely small proportion which our earth bears to this vast aggregate of systems, let us suppose 5000 blades of grass to grow upon a square yard, from which we find, by calculation, that a meadow one mile long by two thirds of a mile in breadth, will contain 10,000 millions of blades of grass. Let us then imagine such a meadow stretches out to the length of a mile before us; and the proportion which a single blade of grass bears to the whole herbage on its surface, will express the relation which our earth bears to the known universe!

But even this is exclusive, probably, of millions of suns, 'bosomed' in the unknown depths of space, and placed forever beyond our ken, or the light of which may not have had time to travel down to us since the period of their creation.

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MONUMENT OF GENGIS KHAN.—A monument of the remotest times of the dominion of the Mongols, was lately sent to St. Petersburg, from the Ural mines. It is a slab of granite, with an inscription in an oriental language engraved on it, and which had been preserved for several years at Nertschinsk, having been found among some ruins on the banks of the little river Konduja, on the frontiers of China.

ANTIQUITIES.—A gold coin, of the value of an English sovereign, was recently dug up at Champagnolle, France, in excellent preservation, having a head of Adrian, with the legend, *Hadrianus Augustus Con. III. P. P. (Pater Patriæ.)* As the third consulate of Adrian corresponds to the 119, of our æra, there is no difficulty in determining the exact age of the piece.

DISCOVERY.—Several very ancient tombs have recently been discovered near Stolzenhayn, in Prussia, remarkable for their contents. In one of them, was a sword, two yards long; two battle-axes; two iron lances, and some scissors. In another, beside an urn full of human bones, were two knives, a hatchet and several buckles. All the articles have been deposited in the Museum at Halle.

RARE MEDALS.—While a laborer was digging a well, a few months ago, in the province of Sundermania, an earthen pot was discovered, nearly full of antique rings, a collection of medals, mostly Anglo-Saxon, of the time of king Ethelred, and the German medals of Otho. The treasure weighed 109 oz., and is now offered for sale by the Swedish Government.

METHOD OF PREPARING SKELETONS OF BIRDS.—Having picked off the feathers, give the bird its natural position on a bit of board, by supports of wire, variously arranged. Thus secured, place it in the neighborhood of ant-hills. Those industrious little animals will soon, with the aid they get from flies, present you with a perfectly clean white skeleton, kept together by the original ligaments.

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To Correspondents.—Dr. Stephen W. Williams, of Deerfield, Mass., will please accept our thanks for his very interesting manuscript. It will soon be in print.

Ornis will be served in turn. His whippoorwill need not be melancholy;—poor bird, we shall not pluck its feathers off at present.

A Reader did well to refer our minds to the French story of Josephine, the somnambulist.

The Pilgrim's Progress in Phrenology has been received, and Uncle Toby shall have a fly to play with by the middle of March.

More Circles.—There are enough on hand already.

Mr. Thompson's paper cannot be inserted, with propriety.

Rev. Mr. Johnson's letter requires no answer.

Dr. Wilson's catalogue of plants is not new.

Dr. Williamson shall have an extra number of copies printed as soon as his article is impossed.

T. T.—By some mishap, the manuscript signed T. T., instead of being original, is an exact copy of page 205 of the 'Encyclopædia Americana. How remarkable it is, that two writers should have had the same ideas, and expressed them in precisely the same veritable English words.

The 'Baltimorean' is desired to examine Lawrence's Treatise on the Horse, for a solution of his problem.

W. W. S., of Philadelphia, is very rational in his conjectures: were he ever in Bedlam, he must have been only a visitor.

***.—Three stars would twinkle to little purpose at noon day. However, under circumstances of peculiar want, when nothing else can be procured, with an opera-glass, we intend making observations on their parallax.

Mr. Staughton has more talent for boring, than for making calculations on the curve described by a ball shot from a short rifle.

☞ Poetry must abound in the technicalities of science, to be serviceable in this publication. Our printer knows nothing about coral lips. With all proper courtesy, we recommend the author to forward his communication to our sublime townsman, the man who manufactures 'First Impressions.'

Schools.—There is no exertion on the part of teachers to extend their influence in the most decidedly profitable manner, according to our view of things. The essay with the above signature is miserable. If the writer is a public teacher, he had better sell his estate, and go to the rocky mountains immediately. O, Jemmy Thompson—Thompson Jemmy, O!'

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

MARCH 15, 1834.

THE VULTURE.

An account of some experiments made on the habits of the Vultures inhabiting Carolina, the TURKEY BUZZARD* and the CARRION CROW,† particularly as it regards the extraordinary powers of smelling, usually attributed to them.—By J. BACHMAN.

ALTHOUGH the vultures inhabiting the Southern States are among the most common of our larger species of birds—remaining with us during the whole year,—building their nests in the hollows of fallen trees and stumps around our plantations—resting on our housetops and seeking their food around our markets and in the very streets of our cities, yet it appears that a difference of opinion exists with regard to some of their faculties, and particularly whether they find their food by their sense of smell or of sight.

It has been the long established belief of all civilized nations, since the time of the Romans, that vultures were possessed of extraordinary olfactory powers by which they were enabled to scent their food at the distance of many miles. Whether this opinion was founded on truth, or whether it was a vulgar error, having its origin with the thousands of others which have been handed down from age to age, originating in ignorance or superstition, cannot be fully ascertained until satisfactory experiments are made on the olfactory powers of the vultures of Southern Europe, Asia and Africa.

* Cathartes Aura Ill. † Cathartes Iota Bonn.

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All the writers on American Ornithology, have ascribed to the vultures of the United States, the same extraordinary powers of smell, with the single exception of Mr. Audubon, who, in a paper published in Jameson's Journal, Edinburgh, 1826, detailed a series of experiments made in America several years previous, from which he came to the conclusion that these birds are guided to their food altogether by the eye. He found by repeated experiments, that vultures were attracted by a dried deer-skin, stuffed in imitation of that animal, and that in these instances, when no effluvium could exist, they could not have been led to it by the scent. He next concealed a dead animal in the heat of summer, in such a way that it could not be observed by the vultures, although the scent was not obstructed; here it was suffered to decay without having been discovered by these birds.

He next procured two young carrion crows, which he tamed and reared in a cage, the back part of which was so closed that objects approaching from that side could not be seen. Whenever he came with food to the front of the cage, the birds jumped at the bars, commenced hissing and putting their bills towards each other, as if expecting to be fed mutually, as their parent had done; when, however, the cage was silently approached from behind with animals and flesh, however putrid, no movement was made by the birds to indicate their having observed by the effluvium, that their favorite food was near.

The sentiments thus expressed by Audubon, were at the time, and are still, treated with a good deal of severity, both in Europe and in his native country.

It has always appeared to me an act of injustice to condemn any man for expressing an opinion on subjects of Natural History, merely, because from his own investigation, he had arrived at different conclusions from those who had lived before him, particularly when the error could be so easily detected by instituting a similar course of experiments; such a course of conduct would be a bar to all improvements, and the sincere inquirer after truth would have to contend against a host of prejudices from those, who, adopting the opinions of others, refused to

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make those inquiries which would satisfy their own minds, that their opinions were fortified and confirmed by *experience.*

The details of the experiment made by Audubon, are of such a character, that either the conclusions at which he arrived are correct, and our vultures do not possess extraordinary olfactory powers, or he has given to the world an unfair statement, and is therefore not a man of veracity, and is undeserving of the confidence of the community. Should such an impression be unhappily made on the public mind, it will not only have a tendency to destroy his usefulness, but will deprive him of those pecuniary resources which are requisite to enable him to carry on successfully a very expensive publication; a publication which cannot fail to prove a very important acquisition to the natural history of our country—and to establish an abiding monument to the fame of its author.

The lovers of American Ornithology, who feel under many obligations to the man who has devoted so many years of his life to this interesting department of Natural Science, will not condemn him unheard; and those particularly of our Southern States, who would show themselves very careless observers of nature, and very indifferent to the character and fame of Audubon, if, possessing as they do so many favorable opportunities for investigation, they did not institute some inquiries, not only to do an act of justice to a distinguished naturalist, but to ascertain an interesting fact in natural history.

No one who will read Mr. Audubon's paper on the subject, containing a full detail of a number of experiments on the habits of our vultures, can deny, that if he intended to deceive the world, he certainly chose a subject where detection was easy and certain. In our Southern States, these birds are so abundant as to have become a nuisance, particularly in our cities. It is but an act of justice to Mr. Audubon to state, that in his frequent visits to Charleston, he has fearlessly invited investigation on this disputed subject.

During his absence he wrote to me on several occasions, urging me to make further experiments; a number of

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engagements prevented me from devoting as much time to the subject as was necessary to investigate it in such a manner as to prove satisfactory to my mind, and I postponed it to a more leisure period. On the recent visit however of Mr. Audubon, I consented to institute these inquiries, in the prosecution of which, I was aided by the intelligence and experience of such disinterested naturalists and men of science as could be obtained.

It will be observed that our experiments were confined to our two species of vulture—Cathartes Aura and Cathartes Iota, which are so common in Carolina. There are three other species which have been described by authors, to frequent the southern and western portions of the United States. The Vulture Californianus (Lath.) undoubtedly exists west of the Rocky Mountains, as specimens were procured near the Columbia River by Mr. Douglass, but we have no evidence of its existing to the eastward of that great chain. The existence in the United States of the great condor,* is only conjectured from a bill, and a quill-feather brought by Lewis and Clarke from the Columbia River, and deposited in the Philadelphia Museum. The beautiful king of the vultures† is said to appear occasionally in Florida, upon what authority I am unable to state. None of the gentlemen, however, who have resided at Key West, and other portions of Florida for many years, have been able to find this bird. Mr. Audubon, however, in his indefatigable exertions in that country, found a different species which was not before known to exist in the United States—the Caracara Eagle,‡ of which I have received several specimens through the kindness of Dr. B. B. Strobel and Dr. Leitner, that had been procured between Tampa Bay and Key West. Whatever powers of smelling these (with us rare species) may possess, I am unable to state from actual experiment. But it will probably be discovered that their olfactory powers have been as much overrated, as was the size of the famous Condor, whose quill-feather, even as late as 1830, was described as 'twenty good paces long,' and which, on actual measure-

*Cathartes Gryphus Temm. †Cathartes Papa Ill. ‡Polyborus Vulgaris.

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ment, has been found of less dimensions than that of several species existing on the Eastern Continent. But laying aside speculations on a subject which time and further observations only can decide, I proceed to a detail of facts that have come under my observation.

On the 16th Dec. 1833, I commenced a series of experiments on the habits of our vultures, which continued till the end of the month, and these have been renewed at intervals till the 15th of Jan. 1834. Written invitations were sent to all the professors of the two Medical Colleges in this city, to the officers and some of the members of the Philosophical Society, and such other individuals as we believed might take an interest in the subject. Although Mr. Audubon was present during most of this time, and was willing to render any assistance required of him, yet he desired that we might make the experiments ourselves—that we might adopt any mode that the ingenuity or experience of others could suggest, of arriving at the most correct conclusions. The manner in which these experiments were made, together with the results, I now proceed to detail.

There were two points, in particular, on which the veracity of Audubon had been assailed; 1st, Whether the vultures feed on fresh or putrid flesh, and 2nd, Whether they are attracted to their food by the eye or scent.

On the first head it was unnecessary to make many experiments, it being a subject with which even the most casual observer among us is well acquainted. It is well known that the roof of our market-house is covered with these birds every morning, waiting for any little scrap of fresh meat that may be thrown to them by the butchers. At our slaughter-pens the offal is quickly devoured by our vulturés, whilst it is yet warm, from the recent death of the slain animal. I have seen the Vultur Aura a hundred miles in the interior of this country, where he may be said to be altogether in a state of nature, regaling himself on the entrails of a deer which had been killed not an hour before. Two years ago, Mr. Henry Ward, who is now in London, and who was in the employ of the Philosophical Society of this city, was in the habit of depositing at the

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foot of my garden in the suburbs of Charleston, the fresh carcasses of the birds he had skinned, and in the course of half an hour, both species of vulture, particularly the turkey buzzard, came and devoured the whole. Nay, we discovered that vultures fed on the bodies of those of their own species that had been thus exposed. A few days ago, a vulture that had been killed by some boys in the neighborhood, and that had fallen near the place where we were performing our experiments, attracted on the following morning the sight of a turkey buzzard, who commenced pulling off its feathers and feeding upon it. This brought down two of the black vultures, who joined him in the repast. In this instance, the former chased away the two latter to some distance, an unusual occurrence, as the black vulture is the strongest bird, and generally keeps off the other species. We had the dead bird lightly covered with some rice chaff, where it still remains undiscovered by the vultures.

2nd. Is the vulture attracted to its food by the sense of smell or sight? A number of experiments were tried to satisfy us on this head, and all led to the same result; a few of these I proceed to detail.

1st. A dead hare,* a pheasant,† a kestrel,‡ (a recent importation from Europe,) together with a wheelbarrow full of offal from the slaughter-pens were deposited at the foot of my garden. A frame was raised above it at the distance of twelve inches from the earth, this was covered with brush-wood, allowing the air to pass freely beneath it, so as to convey the effluvium far and wide, and although twenty-five days have now gone by, and the flesh has become offensive, not a single vulture appears to have observed it, though hundreds have passed over it, and some very near it, in search of their daily food. Although the vultures did not discover this dainty mess, the dogs in the vicinity, who appear to have better olfactory nerves, frequently visited the place, and gave us much trouble in the prosecution of our experiments.

*Lepus timidus. †Phasianus Colchicus. ‡Falco Tinunculus.

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2d. I now suggested an experiment which would enable us to test the inquiry whether the vulture could be attracted to an object by the sight alone. A coarse painting on canvass was made representing a sheep skinned and cut open. This proved very amusing—no sooner was this picture placed on the ground than the vultures observed it, alighted near, walked over it, and some of them commenced tugging at the painting. They seemed much disappointed and surprized, and after having satisfied their curiosity, flew away. This experiment was repeated more than fifty times, with the same result. The painting was then placed within ten feet of the place where our offal was deposited—they came as usual, walked around it, but in no instance evinced the slightest symptoms of their having scented the offal which was so near them.

3d. The most offensive portions of the offal were now placed on the earth, these were covered over by a thin canvass cloth—on this was strewed several pieces of fresh beef. The vultures came, ate the flesh that was in sight, and although they were standing on a quantity beneath them, and although their bills were frequently within the eighth of an inch of this putrid matter, they did not discover it. We made a small rent in the canvass, and they at once discovered the flesh and began to devour it. We drove them away, replaced the canvass with a piece that was entire: again they commenced eating the fresh pieces exhibited to their view, without discovering the hidden food they were trampling upon.

4th. The medical gentlemen who were present made a number of experiments to test the absurdity of a story, widely circulated in the United States, through the newspapers, that the eye of a vulture, when perforated and the sight extinguished, would in a few moments be restored, in consequence of his placing his head under his wing, the down of which was said to renew his sight. The eyes were perforated; I need not add that although they were refilled and had the appearance of rotundity, yet the bird became blind, and that it was beyond the power of the healing art to restore his lost sight. His life was, however, preserved by occasionally putting food into his mouth.

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In this situation they placed him in a small out-house, hung the flesh of the hare (which had now become offensive) within his reach, nay, they frequently placed it within an inch of his nostrils, but the bird gave no evidence of any knowledge that his favorite food was so near him. This was repeated from time to time during an interval of twenty-four days (the period of his death) with the same results.

We were not aware that any other experiments could be made to enable us to arrive at more satisfactory conclusions, and as we feared if prolonged, they might become offensive to the neighbors, we abandoned them.

As my humble name can scarcely be known to many of those into whose hands this communication may fall, I have thought proper to obtain the signature of some of the gentlemen who aided me in, or witnessed these experiments; and I must also add, that there was not an individual among the crowd of persons who came to judge for themselves, who did not coincide with those who have given their signatures to this certificate.

We, the subscribers, having witnessed the experiments made on the habits of the vultures of Carolina (Cathartes Aura and Cathartes Iota) commonly called Turkey Buzzard and Carrion Crow, feel assured that they devour fresh as well as putrid food of any kind, and that they are guided to their food altogether through their sense of sight and not that of smell.

ROBERT HENRY, A. M.
President of the College of South Carolina.
JOHN WAGNER, M. D.
Pro. of Sur. at the Med. Col. State S. Ca.
HENRY R. FROST, M. D.
Pro. Mat. Med. Col. State S. Ca.
C. F. LEITNER,
Lecturer on Bot. and Nat. Hist. S. Ca.
B. B. STROBEL, M. D.
MARTIN STROBEL.

It now remains for naturalists to account for the errors which have for so many ages existed with regard to the power of scent ascribed to our vultures. Indeed, it is highly probable that facts elicited from the experiments of Audubon on our two species of vulture, strengthened by those instituted on this occasion, may apply to all the rest

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of the genera. Perhaps it may be discovered, that the whole family of vultures are altogether indebted to the eye in their search after food; indeed this may yet be found true in regard to the whole feathered tribe. It is, I believe, a common practice in England, for persons who attend on the decoys for wild ducks, to carry a piece of burning peat which they hold near their mouths, to prevent the birds from smelling them, as it is also customary in America to burn gunpowder in various portions of the cornfields, under an impression that the smell of the powder will frighten away the crows. The powder manufacturers can have no great objection to this latter practice, and it must be confessed, that it is among the most innocent ways that powder can be wasted. But I fear that this will not benefit the crops of the farmer. These birds, together with the raven,* and even the wild turkey,† can be approached under cover of a bank or tree, and if they do not either see or hear you, it will, I apprehend, be a difficult matter for them to find you out, by their olfactory powers. Indeed I am of opinion that while to quadrupeds (particularly carnivorous ones) the faculty of scent is their peculiar province, this organ is but imperfectly developed in birds. As it does, however, exist, (although in an inferior degree), I am not disposed to deny to birds the power of smell altogether, nor would I wish to advance the opinion that the vulture does not possess the faculty of smelling in the slightest degree, (although it has not been discovered by our experiments). All that I contend for is, that he is not assisted by this faculty in procuring his food—that he cannot smell better, for instance, than hawks or owls, who, it is known, are indebted altogether to their sight, in discovering their prey. If our vultures had to depend on their olfactory powers alone, in procuring food, what would become of them in cold winters, in Kentucky and other of our western states, where they remain all the year, and where the earth is bound up with frost for months at a time, and where consequently, during that

* Corvus Corax. † Meleagris Gallipavo.

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period, putridity does not take place? And if they depended alone on tainted meat for food, how soon would the whole race (at least in our temperate climates) die of hunger?

How easily error may be perpetuated from age to age, we may learn from a thousand other visionary notions, which the careful observations of recent travellers and naturalists have exploded. At this day, the belief is very general in this country, that immediately after a deer has been killed, the vultures, at the distance of many miles, are seen coming in a direct line, against the wind, scenting the slaughtered animal. This may be accounted for, with a little observation, upon rational principles. When a deer* is killed, the entrails are immediately taken out; these, together with the blood which covers the earth to some extent, are seen by some passing bird—he directly commences sailing around the neighborhood—he is observed by those at a distance; the peculiar motion of his wings, well known to those of his own species, communicates to them the intelligence that something good for them is perceived. These, hastening to the place, give information to those who are still further off, and in the course of an hour, a very great number are guided to the spot. But it will scarcely be argued, that this great concourse of vultures has been attracted by the effluvium of putrid flesh, since the animal has been killed but an hour before.

In the prosecution of our experiments, we discovered that the powers of sight in our vultures were not as great as those possessed by the falcon tribe. A dead fowl was discovered by them at the distance of 70 or 80 yards; a sheep at 100 or 120 yards. These, however, were stationary objects, lying on the ground. One of their own species, however, flying in the air, is no doubt observed by them at a much greater distance. It may easily be conceived why the sight of the vulture is less acute than that of hawks or eagles. The latter prey upon birds, quadrupeds, &c., for which they have to hunt, the former feed chiefly upon dead birds, quadrupeds or reptiles, and fre-

* Cervus Virginianus.

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quently those of a large size, which it requires no extraordinary powers of vision to discover. An argument much relied upon by those who advocate the doctrine of the olfactory powers of vultures, is the circumstance of their usually flying against the wind, as if to discover and follow some current of tainted air. This practice, it may easily be perceived, is not more common to the vulture than to that of any other bird. It is a mistaken idea, that birds in their migrations, or on any other occasion, prefer flying with the wind. This is inconvenient and uncomfortable to them, and the careful observer of the flight of birds, is well convinced that all birds—the vulture among the rest, prefer facing the wind, not to enable them to smell their food, but to render their flight more easy and pleasant.

It may next be inquired, for what purpose are the wide nostrils and olfactory nerves given to the vultures, if they are not intended to assist them in procuring their food? To this I answer, that the olfactory nerves of our vultures are not larger than those of many other birds, and their nostrils are less even than those of the hooping crane,* which discovers its food, (as I strongly suspect every bird does), by the eye alone. The wide orifice in the beaks of vultures, and which is generally considered as the true nostril, is probably a wise provision of nature to enable a bird which from its filthy habits of feeding, is continually exposed to have its nostrils closed up—to blow out any substance calculated to obstruct them. The same may be said of the hooping crane, which, from the manner of its digging for roots in the earth, is liable to the same inconveniences. Several heads of the vultures are now in the hands of individuals connected with our medical colleges for dissection. A satisfactory elucidation of the subject will require time, patience, and an extensive knowledge of comparative anatomy in regard to the various species of birds. The result of these investigations will probably be communicated to the public in the course of a few months.

After having resorted to the means detailed above, to satisfy myself of the accuracy of the statements of Audu-

* Grus Americanus Temm.

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bon, as regards the habits of the turkey buzzard detailed in Jameson's Journal, I once more carefully read over his remarks on the subject, and I now feel bound to declare, that every statement contained in that communication, is in accordance with my own experience, after a residence of twenty years in a country where the vultures are more abundant than any other birds—and I have reason to hope from the characters of the writers who have doubted his veracity, that when they have read a detail of these experiments, they will either repeat them to the satisfaction of their own minds, or place confidence in the statements of those who have taken this trouble; and that they, with that generosity of feeling so distinctive of those who are engaged in liberal and kindred pursuits, will be gratified to assign to Audubon, that meed of praise which he so undoubtedly merits.

Charleston, Jan. 18th. 1834.

[Furnished for the Tracts and Lyceum.]

FURTHER OBSERVATIONS ON THE QUADRATURE OF THE CIRCLE.

HAVING sometimes reflected on the quadrature of the circle, though I have never attempted the solution of this long celebrated problem, and my ideas being excited afresh upon this subject by the reading of some articles in the Tracts and Lyceum relating to it, I have undertaken to commit some of my cogitations to paper.

I have long been convinced of the inanity of all the pretended solutions of the question, which so frequently intrude themselves on the public. I have, however, permitted fancy to intrude itself into the field of mathematics, and consequently, have imagined things concerning the solution of this irreducible. I am inclined to think it not only true, but actually demonstrable, that the expression of the quadrature, or in other words, the ratio of the diameter and circumference of a circle, to the determination of

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which this question reduces itself, is not merely incommensurable in numbers, but inexpressible by any algebraic formula, other than an *irreducible* infinite series. That is, that it is not expressible in terms of surd roots of any kind, or at least, of the second degree.

The expressions of surd roots are, it is well known to mathematicians, capable of actual geometric developement, the square root of 2 being involved in the expression of the diagonal line of a square, for instance. Now though a *portion* of the *numerical developement* of the ratio of the diameter and circumference of the circle has been actually obtained, yet no geometrical process has ever been discovered, of which we could avail ourselves, actually to develope this ratio. Now the expression of the dimensions of a curve would seem, in the nature of things, to be of a *different kind* from the expressions of rectilineal quantities. No part of a circle, unless we take an arc infinitely small or a circle infinitely large, can be compared with a right line. Then, since surds of the second degree are expressions of right lines, I think we may conclude, that the ratio sought cannot be expressed in terms of surds of the second degree. This is by no means a demonstration, but it may serve to show how remote we are from being able to form a conception of the *kind* of quantity of which curved lines are the expression.

If this question ever meets with a true *geometrical* solution, I am convinced that it will be in no other way than the following: that some curve of the higher orders may be discovered, whose relation to the circle shall be such, that it, or some of its dependent lines, may cut the circle at such points, as that if a square were made to intersect the circle in those points, its area would be that of the circle. But after all, if any curve be discovered which will give the true section of the circle, let it be remembered, that it will not render the area of the circle less incommensurable; and that this intersecting curve will and must be as incommensurable as the circle itself.

A method has been discovered, or is in progress, as your correspondent is informed, of solving the problem by constructing *spherical logarithms* which are to give the

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whole solution in full, without any approximation whatever. The discoverer has been employed, it seems, some years in the prosecution of his object, and only waits a remuneration for his toil, to lay the matter before the public.

This thing may have something at the bottom of it, and it merits examination; but the business looks a little too much like the alchymists' plan of changing lead to gold, which required years for completion, and which few were able to understand, or were permitted to look into. It is, we presume, the same that Mr. A. Y. refers to in his article on this subject in the last number of the Tracts and Lyceum. O. S.

To the Editor of the Tracts and Lyceum.

I HAVE been interested in reading the communication in the Tracts and Lyceum, concerning the Springfield Somnambulist, and several inquiries respecting her having suggested themselves, which, being answered, might elucidate the philosophy of the mental phenomena of the case, I take the liberty to propose them.

Was the patient, *during her paroxysms*, ever made acquainted with her then actual state, and if so, what effect had that on her?

How extended was the knowledge she possessed during these paroxysms, and to what things did it relate?

How much of this knowledge was evidently *a portion* of that which she possessed in her waking hours, and how much, and what part was peculiar to her sleeping state?

How is it probable that particular portions of this peculiar knowledge could have been obtained?

When changes in things under her observation took place during her sanity, how were they regarded by her during her sleeping paroxysms?

Perhaps some of your readers have seen a French story of a Josephine, who was a somnambulist, and who, when in one of these fits, was directed to write a statement of what she was doing, and to sign it. She did so, and on

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awaking, recognized her hand-writing, though she had no recollection of writing it. What might be the effect of similar experiments upon the lady in question?

Are the circumstances attending the paroxysms traceable to any peculiar state of some organ or organs of the brain?

Do any of the powers of these organs manifest themselves in a strong and palpable manner, especially such organs as are not powerful during her ordinary waking state?

A READER.

[Furnished for the Tracts and Lyceum.]

THE WHIPPOORWILL.

HAVING never seen any particular account of the habits of the *whippoorwill*, and being under the impression that they are not well known, I thought the following remarks might be interesting to some.

The peculiar cry of this singular bird, which resounds in all our groves during the early summer evenings, is familiar to every one; but its *object*, in making this cry, is perhaps known to few among the acquaintances of this nocturnal visitor.

It seems that it is the call of the bird to its mate. Having lived where they came nightly to the very door, I have had a good opportunity to watch their habits, as far as the dusk of twilight would permit. After the call of whippoorwill had been repeated for some time, another individual would frequently arrive, and then it ceased. There was then heard a kind of croaking in a low and subdued tone, or else a clucking, with intervals of over a second between each note.

From these circumstances, we have good reason to believe that the cause assigned is the true one. From the apparently solitary habits of the bird, and the time at which it comes out from its solitudes of the forest, it would

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seem necessary that the bird should have some means of indicating its place to its mate.

A similar provision is assigned to the glow-worm, whose winged partner would with difficulty find its creeping consort, were it not thus provided; and this is no doubt the use of the flickering taper of the fire-fly, which we all have loved from our childhood.

The whippoorwill begins to sing about the first of May, but is not much heard till near the middle. His song gradually dies away in June, and, by midsummer, he is hardly to be heard. He is one of our most singular birds, and, I think, peculiar to our country. ORNIS.

[From the Advocate of Science.]

TRANSPORTATION OF PERIODICALS.

A WRITER in the Boston Tracts and Lyceum has been indulging in some speculations relating to the conveyance of papers and periodicals over the United States. He objects to the post office system as being too expensive; and more so than necessary, from the rapidity with which the mails are transported: our mail stages carrying a load of 1000 pounds at the rate they now proceed, and at three times the expense of conveying the same load at a moderate rate. He states, that to transport this load, on the present system, the horses are changed every twelve miles. To carry the load thirty-six miles, therefore, twelve horses are required; at the rate of four miles an hour, four horses would transport this load in wagons. Hence, at a moderate speed, a load of magazines and books would be conveyed at one third the cost of transportation by rapid mail stages; and this would greatly promote the diffusion of knowledge.

We do not accord with this writer's project, for several reasons. The first is, because the evil he complains of—the postage on periodicals—may be remedied by other means, without retarding their progress over the country.

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That is, simply by paying no postage at all. The propriety of this measure was under consideration at the last session of Congress; and we can see no good reason why it was not adopted. For sure, there is no race of mortals on earth who labor so hard for the public good, and receive so little encouragement, as the members of our own honorable fraternity; and particularly such as are engaged in conducting scientific periodicals. To our entreaties for patronage, the people will tell us they can understand nothing about science, and consequently it would be nonsense for them to subscribe to our works. They will not believe, that to science they are indebted for the larger proportion of their comforts—to half-starved editors and authors for all their knowledge. As for soliciting assistance from government, in any scientific enterprise, it would be just as rational to ask charity of a miser. We give it credit, however, for opening its heart so much in reply to a reasonable favor, as to tell some of us to call again. But this is not what we began to speak about. If editors were permitted to send their papers through the country free of postage, and to receive their letters with the same bounty, it would conduce more to the diffusion of knowledge, than by transporting them at the rate of four miles an hour from one end of the country to another. In some cases, our 'Monthlies,' 'Quarterlies' and 'Annuals,' would be months, and quarters and years in reaching their destination. No, no; we prefer the old plan, if it does cost a little more. Admitting the adoption of the one proposed, we can illustrate the effect by an anecdote which happened under our eyes one day, two or three years since, while waiting very patiently at the post office for the mails to be opened. It so happened that one of the mail stages was on the point of starting off, when the driver was hailed by an honest looking farmer, who asked if his stage passed through a town about twenty miles distant. On receiving an affirmative answer, he was half way in the vehicle, when, as by an instinctive impulse, he glanced at the horses, whose large, prominent ribs had been advertising for oats a long time past. Here he paused; and the driver, wondering what should keep him

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there, solicited him to proceed. 'Not I, eheigh,' was the reply; 'I 'll walk there, bein' as I 'm in a sort of hurry.' So people will not wait for a four-mile-an-hour cart, when they have those that go five times as fast.

PLAN OF AN AFRICAN ANT HILL.

THE African Ant, *termites*, is celebrated for the high edifices which it rears, in the form of a sugar-loaf, so solid and firm, that wild cattle run over them with impunity, never breaking through. Some of these dwellings exceed twelve feet in height. Internally they are divided into numerous apartments, and have subterranean galleries, says the German Lexicon, connected with them, from the extremities of which, the insects issue, to commit depredations. When the structures are broken open, the soldiers fight with great fury, and bite everything they meet. Each colony of all the different species of ants, say most entomologists, contains but just one perfect male and female. In tropical climates, termites are a terrible scourge, as they destroy every kind of cloth, as well as wooden furniture: what is worse, they undermine, completely, the

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foundations of houses, and eat out the entire body of the frame, so as to leave only the outside shell and original shape of the timber.

FOSSIL TEETH.

M. Humboldt, in his letters dated Lima, 1802, to C. Delambres, one of the perpetual secretaries of the National Institute, says, 'Besides the elephants' teeth which we sent to G. Cuvier, from the land of Santa Fe, one thousand three hundred and fifty toises in height, we have preserved for him others more beautiful: some of the carnivorous elephant, and others of a species a little different from those of Africa, brought from the valley of Timaney, the town of Iborra, and from Chili. Here, then, we have confirmed the existence of this carnivorous monster from the river Ohio, from fifty degrees northern latitude to thirty-five degrees south latitude.

Near Santa Fe there are found, in the Campo de Gigante, at the height of one thousand three hundred and seventy toises, an immense number of fossil elephants' bones, both of the African species and of the carnivorous kind, discovered near the Ohio. We caused several to be dug up, and have sent some specimens of them to the National Institute. I much doubt whether any of these bones were ever before found at such a great height: since that time I have received two from a place of the Andes, situated about two degrees of latitude from Quito and Chili; so that I can prove the existence and destruction of these gigantic elephants, from the Ohio to the country of the Patagonians.

SIBERIAN ELEPHANT.

In 1799, upon the shores of the Frozen Ocean, near the mouth of the river Lena, in Siberia, a Tongouse chief

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discovered, in the midst of a rock of ice, a substance which did not resemble the floating pieces of wood usually found there: he endeavored in vain to discover what it was at that time: about the close of the second summer the melting of the ice enabled him to know that it was a mammoth; but he could not succeed in obtaining the tusks of the animal until the end of the fifth year, when the ice which enclosed it having partly melted, the level became sloped, and this enormous mass, pushed forward by its own weight, fell over upon its side on a sand bank. In March, 1804, the chief Schoumachoff obtained the tusks and sold them for fifty roubles. In the summer of 1806, Michael Adams, a member of the Academy of St. Petersburg, visited the mammoth in company with the chief, and found it in a very mutilated state. The proprietor was content with the profit he had already derived from it, and the jackouts of the neighborhood tore off the flesh, with which they fed their dogs. Ferocious animals, white bears of the north pole, gluttons, wolves, and foxes, preyed upon it also, and their burrows were seen in the neighborhood. The skeleton, almost completely unfleshed, was entire, with the exception of one of the fore-feet. The spindyle, from the head to the *os coccygis*, a shoulder-blade, the pelvis, and the remains of the three extremities, were still tightly attached by the ligaments of the joints, and by strips of skin on the exterior side of the carcass. The head was covered with a dry skin; one of the ears, well preserved, was furnished with a tuft of bristles. The eyes were also preserved, and the ball of the left eye could be distinguished. The tip of the under lip had been eaten away, and the upper part being destroyed, exhibited the teeth The brain was still in the cranium, but it appeared dry. The parts least damaged were a fore foot and a hind one, covered with skin, and having still the sole attached. According to the assertion of the chief, the animal had been so large and well-fed, that its belly hung down below the knee joints. This animal was a male, with a long mane at its neck; but it had no tail, and no trunk. The skin, three-fourths of which Mr Adams took with him, is a deep gray, and covered with a reddish hair,

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and black bristles, and was of such extraordinary weight, that ten persons moved it with difficulty. The entire carcass (the bones of which he collected on the spot, and the tusks he afterwards procured) is about nine feet high, and fourteen feet long, English measure, from the tip of the nose to the *coccyx*, without, however, comprehending the two horns or tusks, each of which is a toise and a half long, and both together weigh four hundred pounds. The head alone, weighs four hundred and sixty pounds. Mr. Adams collected from the sand bank more than forty pounds of the bristles, which the white bears might have trodden into the wet ground on devouring the flesh. Some of the hair was presented to the Museum of Natural History of Paris, and on examination, was found to consist of three distinct kinds; one of these is stiff black bristles two feet in length; another is thinner bristles of coarse flexible hair, of a reddish brown color, and the third is a coarse reddish brown wool, which grew among the roots of the long hair; affording, according to Cuvier, an undeniable proof that this animal has belonged to a race of elephants inhabiting a cold region.

MILLDAMS PREVENT THE MULTIPLICATION OF FISHES.

The milldams and other artificial obstacles in rivers against the ascent of anadromous fishes have, in some places, entirely expelled them, and in others diminished their number. The salmon, if we may credit the account of Hudson's voyage, formerly visited Hudson river: he is now an entire stranger, and he is retiring very rapidly from the Connecticut river, and from several streams that flow into the western lakes. The disappearance of fish for years, as, for instance, the lobster, during the revolutionary war, and sometimes the visits of strange fish, are circumstances deserving of observation. The best mode of multiplying and preserving shell-fish would be a subject

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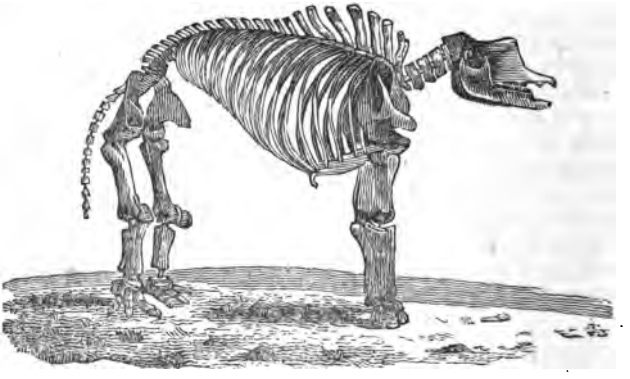
useful to investigate, and why might we not increase our fresh water fish by importing the carp and tench for propagation, as was formerly done in Great Britain?

THE NATIVE MAMMOTH OF NEW-YORK.



THE mammoth of New York, although bearing some general resemblance to the elephant, differs from it in the general figure—in the tusks, formation of the head, prominence and pointedness of the back over the shoulders, its great descent thence to the hips, together with the comparative smallness of the body; there are proofs of greater activity also in the structure of the thigh bones, and the formation of the ribs, which are peculiar, and indicative of greater strength. It also differs in the magnitude of the spines of the back; the proportionate length of the processes from the spine of the scapula; the thickness and strength of all the bones, particularly of the limbs; the teeth, which are of the carnivorous kind; its under jaw, which is distinctly angular, instead of being semicircular, as in the elephant; besides several other striking distinctions. There can be little doubt but that it is, therefore, at least, specifically distinct from the elephant.

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ORIGINAL MISCELLANY.

NEW BOOKS, &c.

THE MECHANIC,—*a Journal of the useful Arts and Sciences*, edited by T. CLAXTON, GEO. W. LIGHT, and J. M. WIGHTMAN. If artizans in the United States, and particularly in New-England, do not sustain this valuable periodical, they do not deserve that honorable place in society, which men of understanding have assigned them. Knowledge is certainly power, but without that kind of practical common sense, and that condensation of analytical experience, which is presented from month to month in the publication before us, the mechanic will labor to disadvantage, because he cannot avail himself of the discoveries of others, and in the end, he will ascertain, but at a period altogether too late, that he has been wasting much of a precious life in preparing to accomplish what has already been done, but of which he was unfortunately totally ignorant. Every mechanic in the twenty-four states should become a subscriber.

AMERICAN ANNALS OF EDUCATION AND INSTRUCTION,—edited by the Rev. William C. Woodbridge. Since the first appearance of the Annals, it has been considered a periodical of a high order, by literary gentlemen in this country and Europe. Mr. Woodbridge possesses very rare qualifications for conducting the work, and most heartily do we desire to hear that its circulation has been widely extended in our own *enterprizing country*.

THE PILGRIM'S PROGRESS IN PHRENOLOGY, *or that Science taught in imitation of John Bunyan; to be printed in three parts. Part I., by Uncle Toby. New London, published by Samuel Green.*

> 'Away went Gilpin, neck or naught, away went hat and wig;
> 'He little dreamed, when he set out, of running such a rig.
> 'His horse, who never had before been handled in this kind,
> 'Affrighted fled, and as he flew, left all the world behind.'

And such appears to be the condition of our author. For insanity there would be some apology, but when, to all human appearance, a man in the full possession of thirty-two phrenological bumps, with malice prepense, and without fear of the ghost of Uncle Toby before his eyes, writes twenty-three pages octavo, of such mysterious nonsense, and with such a title too, he must charitably be

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supposed to have been born with that disease,—no novelty, by the way,—called *cacoethes scribendi*. Our good friend North, not that facetious Christopher North whose portrait looks so majestically stiff on the cover of Blackwood's Magazine, nor my lord North of cabinet notoriety in the annals of the British peerage, but that Mr. North at the South, who indites many good things, has most grossly committed himself in our humble estimation, in the production of a two-penny concern, that neither sustains the doctrines of phrenology, nor exhibits the author's talents in that position in which he can appear both brilliant and original.

Good's Book of Nature, *abridged from the original work:—adapted to the reading of Children and Youth, with questions for the use of Schools, and illustrations from original designs. Boston, Allen and Ticknor. 224 pages.*—Since our first notice of this little volume, we have given it a more thorough examination, and strongly recommend it to the notice of parents. Dr. Good, the author, was a man eminently distinguished for his vast acquirements in science, and for his ardent piety.

Caspar Hauser, *published by Allen and Ticknor.*—Since the assassination of that remarkably unfortunate and mysterious being, the credibility of the memoir has been placed beyond the possibility of doubt, and it strikes us that nothing can be more highly interesting to every class of readers. In a philosophical point of view, an unsurveyed field is laid open, and those who love to study human nature in all its various phases, will find peculiar gratification in these pages. By all means, buy Caspar Hauser.

The High-School Reader, *designed for a First Class Book: consisting of Extracts in Prose and Poetry. By Rev. J. L. Blake. Allen and Ticknor. 408 pages, 8vo.*—The reverend author of this work has been uncommonly successful in the compilation of valuable school-books. No better recommendation is required to any publication designed for the young, than this gentleman's name.

An Account of Jane C. Rider, the Springfield Somnambulist, *by L. W. Belden, M. D.*—Surely, the subject of this memoir is one of the lions of the day! Nothing can be more perplexing to the physiologist, than Miss Rider's anomalous paroxysms:—reading letters through cotton-wool, beating standard old backgammon players, with her eyes shut, hoodwinked with several

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folds of a handkerchief, and all the while asleep, or what is more strange, unconscious of the whole affair. In a previous number of our work, much of Dr. Belden's narrative was anticipated by a valued correspondent, but, after all, the author's account is so interesting, having been an eye-witness, that he should be read in detail by those who have felt the least desire to have a full understanding of the young lady's case. What on earth was she sent to the Worcester Insane Hospital for? We should as soon have thought of consigning the unfortunate patient to the Emperor of Morocco.

THE AMERICAN ANNUAL REGISTER.—Having examined the Register, we have been led to exclaim, How is it, that people of intelligence can suffer such a valuable collection of historical facts as are presented in the Annual Register, to lie upon the publisher's shelves? Every well organized family in the United States should possess the entire series of this exceedingly valuable publication.

MEMOIRS OF MRS. GRAHAM.—We have no knowledge of the lady, and therefore shall say nothing pro nor con.

THE HEIRESS, A NOVEL.—Being turned of twenty-five, our novel-reading days are upon the wane; yet, for the sake of recalling the happy hours of boyhood, we re-read the Vicar of Wakefield, once a year, which is the only work of fiction we could conscientiously recommend.

THE INTELLECTUAL AND PRACTICAL SINGING BOOK, *by Charles Dingly, designed for Teachers and Schools*, 80 *pages*, has made its appearance just when such a treatise was most needed. With this little manual, the youngest child that can read, may learn the principles of Vocal Music. Buy it by all means.

VENTRILOQUISM EXPLAINED.—A miserable production, not worth reading.

LOWTH'S TRANSLATION OF ISAIAH.—The preliminary discourse is truly beautiful. Bishop Lowth was a man of vast acquirements and ardent piety. The volume would be an acquisition to any library.

TRAITS AND TRADITIONS OF PORTUGAL.—Read and be wise, says the proverb. Books of this class are always deeply interesting, and sometimes instructive.

THE STAFF OFFICER, OR THE SOLDIER OF FORTUNE.—As we possess no military propensities—having invariably run at the sight of fire-arms, it would be folly to attempt an analysis of these two volumes.

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SAMUEL, OR FIRST RELIGIOUS LESSONS.—A tolerably clever little affair.

THE AUTOBIOGRAPHY OF JOHN GALT.—The notoriety of Galt will insure a speedy sale of the edition.

P. S. Publishers are reminded that notices of all new works are for their benefit as well as the purchaser's, but we can't say a word about them, unless the book appears directly under the eye.

SCIENTIFIC DOINGS.—No doings at all in this literary emporium, of late, with the exception of some few profound resolves, worthy of the dark ages. These are indeed millennial days for parasites and parboiled sycophants; there being neither envy in any man's heart, nor common sense in all the heads that make pretensions to it.

On Wednesday, the 5th of March, the meeting of the Boston Society of Natural History was as interesting as usual, and as many curiosities were laid on the table as have been noticed at any previous *conversazione*. Being debarred from copying the records of the Society, as we fondly anticipated, the summary of the transactions will be less complete hereafter; but being blessed with a tolerably good memory, no *important facts* can very well escape recollection.

Mr. Hillard's closing lecture before the Massachusetts Charitable Mechanic Association, was an extremely able performance.

Dr. Grigg's lecture before the Boston Lyceum, Thursday evening, March 6th, on Physical Education, was what might have been expected from a gentleman whose whole soul is devoted to that important branch of useful knowledge. The doctor's appratus is beautifully and philosophically constructed.

WHITE ELEPHANTS.—These are exceedingly rare, and therefore the more highly valued in the countries where they are produced. That this color is an anomaly, cannot be doubted: indeed, such animals are probably born with a disease of the skin, or the *rete mucosum*, which is the coloring matter, is not secreted. However, when a white elephant is discovered, he receives the highest degree of care and attention, and in most cases in Asia, is regarded with religious veneration by all the pagans. One of the most august and sublimely sounding titles of his Burman majesty is, *Lord of the White Elephant!*

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SPRATS.—*Clupea sprattus, supposed to be the young of the herring.* By an ancient law of the city of London, regulating the seasons in which certain fish are to be brought to market, it is enacted, that the *first dish of sprats* brought into that city, shall be presented to the Lord Mayor, for his feast, holden on the 9th of November. After that day these fish may be freely sold, but any introduced sooner, are to be forfeited to the city. This law is observed to the present day; and a large dish of sprats uniformly graces the table of the Civic Lord, at his inaugural feast.

FOSSIL REPTILES.—Near Woodstock, Eng., in calcareous slate, the remains of the *Megalosaurus*, a gigantic animal, intermediate between the crocodile and monitor, have been found, *forty feet in length.* The *Iguanodon*, another monstrous lizard, supposed to be upwards of sixty feet long, has been excavated from the iron sand of Tilgate forest. These differ very essentially from any species of reptiles now in existence. There was a time, in the history of our globe, when lizards, of enormous dimensions, seem to have had the entire possession of the earth. Upon their extinction, succeeded the creation of the present races of animals.

PELICANS.—These are huge birds, which reside on the borders of rivers, lakes and the sea coast. Notwithstanding they seem exclusively organized for using their feet in swimming, they occasionally perch on trees. They are gregarious, exceedingly fond of fish, and when very much harassed, lighten their bodies, in order to escape pursuit the more readily, by vomiting up their burden of food, like the common gulls. Their prey is stored up in a capacious pouch suspended to the underside of the bill, from which they have the power of transferring it into the swallow, as the process of digestion makes room below.

FACIAL ANGLE.—The crania of a negro and a Pole, as represented in Blumenbach's Decades, possess the same facial angle, yet the general character of the two skulls is most opposite, when we compare the narrow and keel-shaped Ethiopian with the broad, square form of the Lithuanian. Mr. Lawrence finds the criterion of the facial line a poor key to the intellectual rank of animals or men.

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EGYPTIAN ANIMALS.—The celebrated Mr. Lawrence, author of the *Natural History of Man*, says he has carefully examined the figures of animals and birds engraven on the numerous obelisks brought from Egypt to ancient Rome, and they perfectly resemble those of the present day. St. Hilaire collected numerous mummies of animals from the sepulchres and temples of Upper and Lower Egypt, such as dogs, cats, ibises, birds of prey, monkeys, crocodiles, and an ox's head, embalmed; but there was no kind of difference discoverable in these, from those now in existence. It has long since been ascertained that there is no difference between the size and general configuration of human mummies of that remote epoch, and men of the present century.

TRANSMISSION OF SOUND.—On the 4th. of June last, a succession of guns were heard at Mahabuleshwar Hills, which were fired as a salute at Bombay, on the departure of the Earl of Clare for Poonah, the preceding evening. The distance over which the sound travelled was about 100 miles, 70 of which were over land.

IMPROVEMENT IN STABLES.—*A merciful man is merciful to his beast:* this reminds us of what ought to be done in great livery stables, for the preservation of the health of horses. The ancients floored their stables with stone, and were therefore wholly unacquainted with a multitude of diseases now familiar to farriers. Wooden floors are exceedingly bad, from the circumstance of imbibing fluids, which, acting upon the ligneous fibres, produce a very noxious gas, as poisonous for the horse to breathe as for the grooms.

ORIGINAL STOCK OF DOMESTIC CATTLE.—Cuvier, before his death, came to the conclusion, from a minute osteological examination, that the wild ox, *urus* or *bison* of the ancients, *aurochs* of the Germans, formerly found throughout the greater part of temperate Europe, and still met with in the forests of Lithuania, and of the Carpathian and Caucasian chains of mountains, is not, as many naturalists suppose, the wild original of our common breeds of domestic cattle. Their characters are only found in certain fossil heads and bones; and he therefore came to the conclusion, that the progenitors of these breeds were annihilated by civilization, like the camel and dromedary.

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MORTALITY OF MONKEYS.—Owners of menageries would save a vast deal of money, if they were a little more careful in the selection of fuel for their winter quarters. Monkeys generally die of pulmonary consumption in the course of a year. The lymphatic glands soon become diseased, after the approaching cold weather renders it necessary to make fires in their apartments. If they survive one or two winters, a disease of the bones follows, and a general scrofulous affection of the whole body, and after a long and painful sickness, of which the poor helpless animal can give no account, terminates their existence. Charcoal, bituminous and anthracite coals are positively bad for them. Apartments warmed by furnaces in which wood is the fuel are far less destructive; but of all modes, that of maintaining a uniform temperature by heated water, or the plan of Mr. Fessenden's stoves, is most philosophical. We will venture to predict, that by using this contrivance, to the exclusion of all others, owners of collections of rare animals will make a very great saving, and at the same time, secure the perfect health of the animals composing the menagerie.

SMALL HANDS AND FEET.—Hindoo sabres have been brought to England, of which the gripe was too small for most European hands. Smallness of the hands and feet has been the distinguishing attribute of several varieties of the human race. The Chinese were amused by the largeness and length of Mr. Abel's hands. Capt. Cook describes the natives of Nootka Sound as having small ill-made and crooked limbs, with large, badly shaped feet and projecting ancles. He ascribed the circumstance, however, to their sitting so habitually on their hams and knees. Lewis and Clark found broad, thick, flat feet, thick ankles, and crooked legs, in most of the western savages, whom they visited on their remarkable expedition to the Pacific.

ASIATIC SHEEP.—Immense herds of sheep are driven over the country, wherever the requisite feed exists, of the variety termed *ovis steatopyga*, whose tails are so remarkably broad, heavy, and loaded with fat, that in order to prevent the wool from being torn off, the shepherd supports them with a little pair of wheels. Thousands upon thousands may be seen continually in the neighborhood of Smyrna, drawing their massive sacral appendages on those miniature trucks. The males usually have four horns. This breed yield

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the coarse wool which is brought to the United States in such quantities from Adrianople and Smyrna.

CHIMNEY SWALLOWS, *hirundo rustica*, a well-known bird, visit us about the beginning of April, and retire again the last of September, and always in October. Previous to the annual departure, these swallows congregate in flocks of three or four hundred, on houses or trees, and usually make their flight in the night, to avoid, it is supposed, the birds of prey, which are prodigiously troublesome to them in their perigrinations. Generally, their course is in a due southerly direction, availing themselves as much as possible of a favorable wind.

FOSSIL FISHES.—The most celebrated locality for these singular remains is at Monte Bolca or Vestena Nuova, on the confines of the Veronese territory. The mountain of Vestena Nuova is volcanic, and rises 1000 feet above the limestone. The ichthyolites consist of skeletons, sometimes very perfect, fragments of bones and casts. Many genera and species of these antediluvian remains have been described by Dr. Volta and Blainville.

TO PRESERVE SPECIMENS IN NATURAL HISTORY.—To preserve the skins of animals for exhibition, arsenical soap has been found to be the most perfect guard against vermin, and is prepared in the following manner, viz. camphor 5 oz.; arsenic in powder, 2 lbs.; white soap, 2 lbs.; salt of tartar, 12 oz.; chalk in powder, 4 oz. Rub this thoroughly over the inner surface, and afterward stuff the animal for the case.

HUNTING LEOPARD, *felis jubata*.—It has a fawn-colored fur, covered by small black round spots, not coalescing, but distinct, with a slight mane. It is a native of Asia, but domesticated, and made particularly serviceable to the hunter. When the master goes upon an expedition, the leopard is either conveyed to the field in a carriage, or hooded, and taken on a pad, behind the saddle of the horseman. When an antelope is discovered—for they are used in no other sport—the blind is taken off, and the animal at once bounds towards the timid gazelle. If the leopard is unsuccessful in the pursuit, after one or two efforts, it almost invariably declines any

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further exertion, and returns to its master. A tame specimen described by a French naturalist, was accustomed to go at large in a park, and freely associated with children and domestic animals, purring like a cat when pleased, and mewing when it wished to call the attention of bystanders to its wants.

GRAY PARROT, *psitticus erythacus*.—This species is distinguished for its docility, distinct articulation of words, and its loquacity. It readily imitates any sort of sound, and what is still further remarkable, is wonderfully long-lived. Vaillant speaks of one at Amsterdam, that lived seventy-three years after its arrival in Europe: it moulted regularly every year, for sixty-five years, after which the process became irregular, and the red feathers of the tail were replaced by yellow ones. Persons fond of making pets of these birds, will have more pleasure in this species, than in those of a green plumage.

CLAY FOR FOOD.—Humboldt says the *Ottomaques*, on the banks of the Meta and the Orinoco, feed on a fat, unctuous earth, or a species of pipe-clay, tinged with a little red oxyd of iron. They collect it very carefully, knead it into balls of four or six inches in diameter, which are slightly baked before a slow fire. Whole stacks of this provision are seen piled up before their doors. When eaten, they are soaked a little time in water; and each individual consumes, on an average, about a pound a day. Sometimes the dish is made a little richer, by the addition of two or three lizards, mixed with fern roots.

ROYAL COLLEGES.—The seminaries of this description in Paris, contain, at present, 5,285 pupils. The provincial colleges have 9,675, of whom 4,149 are resident within their walls.

LIBRARIES IN FRANCE.—There are 195 provincial towns in France, possessing public libraries; and their total stock of books amounts to 2,600,000 volumes. Paris contains five public libraries, computed to contain 1,378,000 volumes.

☞ We are indebted to Good's Book of Nature for the engravings in this number.

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TO CORRESPONDENTS.

'Mr. King's' criticisms are certainly correct, and we cheerfully acquiesce in his decision.

'G. R.'—Query—do these initials stand for George Rex? The article is very imperative. However, the thing shall be attended to.

'HINTS TO THE PRINTER'S DEVIL.'—The only devil who has had anything to do with this establishment, is the author of a communication with the above signature. ☞ CHACUN A SON GOUT. ☜

'LALANDE' has been dead a long time.

'GALEN' smells of the shop:—thou wieldest a pestle much better than a pen.

'VIDI.'—What ails this man? Why, his ideas are laboring under a paroxysm of the tic doloreux.

'A CRITIC' reminds us of a line in Pope:—'For this plain reason, man is not a fly.'

MR. AIKIN, from whom we have received so many favors in times past, lays us under renewed obligations.

'TUMULI.'—Any antiquarian researches in the western world will be gladly received. We intend introducing Tumuli's remarks on ancient mounds as soon as room can be afforded, and we do justice to those correspondents whose letters have been longest on file.

MR. THOMPSON.—We have had enough of this gentleman:—really, he presumes to dictate. O for an act, entitled an act for giving presumptuous literary upstarts a hint—without being accused of rudeness.

'A SUBSCRIBER.'—Just give your name, and it can readily be ascertained whether you have ever settled your bill.

NOTE.—Gentlemen are requested to sign their names to whatever they may send us, relying upon our discretion in never making use of them to their disadvantage. Papers accumulate so fast, that it is utterly impossible to print them as speedily as we really desire. Correspondents are respectfully desired to write their manuscript in a plain hand, with good ink, which will save an immense deal of labor in correcting the proof sheets.

'AN OBSERVER' may rely upon seeing the crater opened directly, and woe to those who get scorched by the lava.

'K. F.'s' theory is somewhat ingenious, though it is doubtful whether it is of as much importance as the author supposes.

'MATHEMATICUS' is requested to look into Grund's works on Geometry. Perhaps we are in error ourselves, yet we are unwilling to hazard the experiment of submitting the writer's paper to the public, without being certain of its perfect correctness.

'RECURVOUS,'—from RE, back, and CURVUS, crooked:—a very appropriate signature for a remarkably crooked piece of composition, which either shot, like an excrescence from a warped intellect, or got most terribly out of shape on the way from KENTUCKY. Anything but ideas thrown into PI. Pay the postage, friend, the next time, or we shall assuredly publish your ICONOGRAPHY, and that would throw all your friends into a bilious fever.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

APRIL 1, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

TRADITIONARY AND HISTORICAL SKETCH OF THE INDIANS:

Or, an inquiry concerning the natives who formerly resided in the vicinity, and in the original borders of the town of Deerfield, in the state of Massachusetts; with an historical sketch of ancient Deerfield.

BY STEPHEN W. WILLIAMS, M. D.

It is curious and interesting to observe the manners and customs of men in a state of nature, untaught by science, and unrefined by civilization. By comparing our own comforts and advantages with theirs, we are taught to appreciate the value of philosophy and science, of literature and the arts. We are taught also, to estimate the blessings of industry, which have converted a wilderness into a fertile and inhabited country. Transporting ourselves on the wings of imagination a few years back, we behold the country, where now the busy hum of active industry prevails, where now the fertile plains yield their prolific abundance to the hands of labor, covered with woods or deep morasses, which resounded with the terrific yells of the savage Indian, prowling for prey, and with the howlings of the wolf and the bear.

In the prosecution of this inquiry, I do not expect to be able to advance many new facts with regard to the manners and customs of the Indians. If I am able to corroborate what others have said of them, and to show that the manners and customs of most savage nations on the continent of America are similar, my wishes will be gratified.

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It will have a tendency to show that they were not descended from a race of men more civilized than themselves. Perhaps it may, likewise, show, from the dissimilarity of the manners and customs of the natives of the old and new worlds, that our Indians were not the descendants of the Asiatics. The arts, even among savage nations, rather improve than deteriorate. Their arts are peculiar to themselves. But few traces of them have been found among the Asiatics.

In this undertaking, I labor under some embarrassment from the difficulty of procuring information. Many years have rolled away since the savages left this part of the country; and I am obliged to depend much upon facts derived from some of our aged citizens. Many of these, from the gradual decay of years, and from a destructive sickness which prevailed here in the spring of 1814, have paid the debt of nature; and those who remain, have but little recollection of the Indians. The stories which were told me in early childhood, amused and delighted me. I listened with pleasure to the heroic deeds of my ancestors, and to the accounts of the manners and customs of the Indians; but the memory of youth is treacherous and evanescent, and many of these relations have passed away like the 'vision of a dream.' Enough may, however, perhaps be collected to render the subject entertaining.

Deerfield, or as the Indians styled it, Pocomptuck, was the favorite habitation of many of the tawny sons of the wilderness. Its situation was peculiarly attractive to men who knew no means of procuring a livelihood but fishing and hunting, and occasionally planting a little corn and leaving it to nature to bring it to perfection. It was a tract of country which yielded them abundance of gain with very little labor; and consequently it was highly favorable to Indian indolence. The eastern boundary is Connecticut river, on the banks of which, are large tracts of fertile interval land, which, probably, many years since, were covered with the waters of an immense lake, or inland sea. The most fertile part of the town lies upon the banks of Deerfield river, a smaller stream, the soil upon the banks of which, is alluvial for several miles in extent. This tract is separated from that on Connecticut

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river by two high ranges of hills, one of which is greenstone, the other red conglomerate, or puddingstone, based on red sandstone. From the top of the latter you have now a fine panoramic view of our village, containing nearly one hundred neat dwelling houses and other buildings, and the surrounding country. This view, although not so extensive as that from Holyoke, is by many considered richer, our meadows looking like an immense garden beneath your feet. The greenstone range, after running several miles parallel with the puddingstone range, finally dips under it and disappears, and the puddingstone mountain terminates at the north part of the town, at what are called the sugar loaves. The town comprehends a great variety of soils. Geologically speaking, it contains all the formations; primitive, secondary, transition and alluvial. West of the alluvial, the rocks are entirely primitive. The alluvial tract lying between the primary and secondary, was undoubtedly, at no very distant period, the bed of a lake, which was smaller, and more recent than the large one alluded to above. A great variety of appearances in our meadows corroborate this fact; among the rest, logs, leaves of trees, and driftwood are often found ten or fifteen feet below the present surface, in a good state of preservation, and substantiate the position. A natural dam was the mountain below the Cheapside bridge, which opposed a barrier to the water, which completely overflowed our meadow and street. Through this mountain, the water has forced a passage and found its way to Connecticut river about half a mile below. A tradition handed down from the Indians, informs us that an old Squaw began this passage with a clam-shell. Be this as it may, a dam erected at the rocks below the bridge, as high as the mountain was originally before the gorge was made, would completely overflow our street and meadows. In further support of this opinion, it may be mentioned, that at the foot of our west mountain, which would have been the western boundary of the lake, there is a naked rock, with evident appearances of channels, or furrows, worn in it by the action of the waters of the lake. In addition to this, it may be observed, that upon the margins of the surround-

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ing mountains, which must have been the borders of the lake, traces of Indian habitations are found, and also a burying-ground, of which more will be said hereafter.

A tract of country so eligibly situated, must naturally attract abundance of wild animals, fish and fowl. We are correctly informed that the following were some of the animals that formerly roamed upon our hills, or inhabited our waters, viz :—moose, deer, bears, wolves, foxes, raccoons, squirrels of all kinds, woodchucks, hedge-hogs, beaver, otter, musquash, minks, &c. Among the feathered tribes, geese, ducks, loons, cranes, turkies, partridges, quails, pidgeons, crows, black-birds, &c. Among the fish, salmon, salmon-trout, bass, shad, perch, pickerel, dace, suckers, &c. Indeed, it is within the recollection of our oldest inhabitants when all these tenants of the woods and waters were to be found here in the greatest abundance. Fine salmon and bass, each weighing more than thirty pounds, have been caught here within fifty years. It is within my recollection when barrels of shad were taken in Deerfield river in an evening. Now they are so scarce, that they are rarely, if ever, caught. Deer, bears and wolves have been killed here within half a century; and a large moose was killed upon the banks of Connecticut river, with a pine knot, by one of our aged citizens, not seventy years since. He was mounted on an active horse, and set out on his way to church upon the sabbath. He had not proceeded far when he aroused a moose, and gave him chase. They arrived upon the banks of Connecticut river, and the moose plunged into the stream, and the horse and rider followed. They crossed the river and arrived upon a plain, which was bounded by a mountain, about a mile from the river. The rider pursued the moose across the plain to the mountain, back again to the river, and again to the mountain, when the moose appeared to be exhausted and fell. The rider alighted from his horse, seized a pine knot which lay near, and attacked him. The moose struck at him forcibly with his fore foot and missed him. He aimed a well directed blow at his head, which disabled him, and by repeating his blows, dispatched him.

An aged hunter informed me that he had killed upwards

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of five hundred deer on the hills between Deerfield and Connecticut rivers, besides many bears and wolves. Many of the smaller animals, birds and fishes, are still to be found in this town. Innumerable flocks of geese and ducks in their migrations from the warm climates to the lakes, annually visit us. Ducks usually tarry about a fortnight. Penhallow relates a story in relation to the number of ducks formerly found in Deerfield, which appears to be almost incredible and astonishing. 'About three days after the renewal of the treaty,' which was made in Deerfield, 'a number of Indians went a duck-hunting, which was at a season of the year that the old ones generally shed their feathers in, and the young ones are not so well flushed as to be able to fly; they drove them like a flock of sheep before them into the creeks, where, without either powder or shot, they killed at one time four thousand and six hundred. The English bought them for a penny a dozen.' They are now so much molested that they seem fearful of visiting the abodes of civilized man.

This favorite abode of so many tribes of animals, birds and fishes, could not be long unknown to a race of men who were chiefly dependent upon fishing and hunting for a precarious subsistence. The Indians are well acquainted with the courses of rivers, and we generally find their settlements, either upon the banks of rivers, the borders of lakes, or upon alluvial tracts of land bounded by woods. The same instinctive habits which lead the beasts of the forests to seek congenial climes and countries, lead the savages to follow them. At the time of the first settlement of Deerfield, there were many Indians in detached villages upon the banks of Deerfield and Connecticut rivers. Little is known of them previous to the first settlement of our ancestors; but from evident appearances, they had for many years, perhaps ages, held the undisturbed possession of the soil. In fact, from these appearances, and the number of bones which are yearly dug up, we are almost led to suppose that the town was rather a vast cemetery, or burial ground, than the regular habitations of men. It is probable, from what can be learnt from the early history of the country, that at the first settlement of Deerfield, there were many tribes residing here, or rather parts of tribes,

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than any individual tribe. It appears that at the first settlement of New England, the natives were thinly scattered over the country. They were by no means so populous as in the southern climes, or as they are now found on the banks of our great western waters. A rock-bound soil, as is the greater part of New England, did not offer to the savages those facilities for procuring subsistence which our great alluvial tracts present. The whole number of tribes which resided in New England in 1620, according to Hubbard, was twenty. Probably these, in time of general war, acknowledged one head or chief, and for convenience, were subdivided into petty sovereignties, which acknowledged a Sagamore or Sachem for their leader. These, on national affairs, acknowledged a grand Sachem or Chief, like our confederated republic. This appears probable from the language of all the Indians in this section of the country being similar. That the tribes, at all times, were not subject to the control of the national chief, appears from their engaging in war without his consent; and after the settlement of New England by our forefathers, some of them enlisted with, and fought constantly by the sides of Englishmen.

After the establishment of our ancestors in this country, the various tribes of Indians were almost constantly engaged, for many years, in bloody wars with the English. They were finally subdued and driven to remote parts of the country. They fought for their homes and their beloved hunting-grounds. Ignorant of the nature of treaties, they, of course, disregarded them, and sought every opportunity of gratifying their revenge against the English for their invasion of their territories. United in common defence and common danger, as their numbers decreased, the tribes became commingled, and different tribes united into one. Those who resided upon Connecticut river in the year 1620, were the Mohegans, the Narragansetts, and the River Indians. Many of the latter tribe resided in Deerfield, Hatfield, Northampton, Springfield and the surrounding country, and were denominated by way of distinction, the Pocamptuck Indians, and the Springfield Indians. It is probable, after the wars with the English,

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many other tribes were incorporated with them. Those who resided in Deerfield, were divided into several villages in situations which appeared to them most eligible for fishing and hunting. There was a large settlement of them at Turner's falls, on Connecticut river, about six miles north-east of the present village of Deerfield; a settlement at Cheapside landing, two miles north of the street, and various settlements on the banks of the supposed lake; and at the time of the arrival of our ancestors, a large settlement in the present village of Deerfield.

The first grant of land in Deerfield by the government, was made to the town of Dedham in 1663, under the administration of Governor Bellingham. It consisted of 8000 acres, and was called the Dedham grant. The following graphic account of the first settlement of this town, is from the pen of Robert Worthington, Esq., in his history of Dedham, who has examined the ancient records of that town, and has done more ample justice in his description, than I can do.

'Deerfield, (called Petumtuck in the records) when the general court ordered 2000 acres of land within the grant of Dedham, to be appropriated for an Indian village at Natick, granted, at the same time, to the proprietors of this town, as a compensation therefor, 8000 acres of any unlocated lands within the jurisdiction, wherever they might choose to have the land.

'In 1663, messengers were sent by the town to examine the chesnut country, (so called in the records—probably some part of Worcester county) near Lancaster. On their return, they reported that the land was tolerably good, but hard to bring under cultivation; and that there was not a sufficiency of meadow. Soon after this report was made, John Fairbanks informed the Selectmen, that there was some very good land about twelve miles from Hadley, where the 8000 acres might be located. Whereupon the Selectmen immediately sent out John Fairbanks and Lieut. Daniel Fisher to discover the land and examine it. These men were instructed first to go to Sudbury and inquire of Ensign Noys; and if necessary, then to go to Lancaster and inquire of Good Willard respecting the land.

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On their return, they reported that they had found the land sought after—that it was exceedingly good; and ought, as soon as possible, to be taken possession of, under the grant. He who has seen the fertile intervals on Deerfield river, and heard of the famous fat cattle annually brought thence to Brighton market; or recollects the subsequent events of Indian warfare at that place, can hardly suppress in his imagination, the glowing and interesting account the returning messengers would give of that country. Lieutenant Fisher, we might suppose, would say, on this occasion, after having given his account of wandering many days in the hilly country, covered with great trees of oak and chesnut, and having described the only settlement of white men seen on his journey to Sudbury, Lancaster and Hadley: 'We at length arrived at the place we sought after. We called it Petumtuck, because there dwell the Petumtuck Indians. Having ascended a little hill, apparently surrounded by rich meadow land, from that spot we beheld broad meadows, extending far north, west and south of us. In these meadows, we could trace the course of a fine river, which comes out from the mountains on the north-west, and running northerly through many miles of meadow, seemed to us to run into the hill again, at the north-east. The tall trees of buttonwood and elm exposed to us its course. That meadow is not soft and covered with coarse water-grass, like that around us here, but is hard land. It is the best land that we have seen in this Colony; we dug holes in the meadow with the intent to find the depth of the soil, but could not find the bottom. At the foot of the little hill we stood on, is a plat of ground sufficiently large to build a village upon, and sufficiently high to be out of the reach of the spring floods. Providence led us to this place. It is indeed, far away from our plantations, and the *Canaanites and Amalekites dwell in that valley*, and if they have any attachment to any spot on earth, must delight to live there. But that land must be ours. Our people have resolute and pious hearts, and strong hands to overcome all difficulties. Let us go and possess the land; and in a few years, you will hear more boast of it in this

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Colony, as a land good for flocks and herds than could ever be justly said of the land of Goshen, or any part of the land of Canaan.'

'When the town heard this report, it immediately appointed six persons to repair to Petumtuck and cause the 8000 acres to be located there. Captain John Pynchon, of Springfield, was employed by the town to purchase those lands of the Indians. He soon after performed that duty, and procured four deeds from the Indians, which deeds were afterwards deposited in deacon Aldis's box. Dedham gave ninety-four pounds ten shillings for these deeds; which sum was procured by an assessment on the common rights in the Dedham proprietary.

'In 1670 the proprietors of Petumtuck met at Dedham. Their whole number was twenty-six. This meeting voted to employ an artist to lay out lots to each proprietor. To present a correct plan to the town of Dedham, a committee of three was appointed to give instructions to the artist, to designate the place for a town where the meeting-house should be built, to locate the Church-officers' lot, and to make a fair assignment of lots to the proprietors.

'In 1672, Samuel Hinsdale, on behalf of Petumptuck, petitioned Dedham to appoint suitable persons a committee to regulate affairs at the former place. The next year he renewed his petition, and urged the distresses of his friends, by means of their remote situation from other settlements.

'What compensation was given to Dedham for their rights in the lands at Petumtuck, does not appear. The purchase was made of each cotenant by each cotenant of the Petumtuck lands.

'This is the beginning of Deerfield, which is much celebrated for its rich meadows, formed by the junction of Deerfield river with Connecticut, for the great number of cattle which are annually fatted there, exceeding both in number and size, any other town in New England of equal extent. The mountain scenery there, is delightful. There, too, are shown the battle-grounds, where the unfortunate Petumtucks contended with the inhabitants for their inheritance, after they had sold it at a fair price.'

The 8000 acres began at Pocomptuck river near Cheap-

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side, and extended south so as to contain all the meadow-lands, the town plat, Bloody-brook village, and all the flat lands within the hills to Hatfield line; but when it was laid out, it was thought to encroach upon the limits of Hatfield. To overcome this difficulty, an additional grant was made to Dedham north of the river. Additional grants were made by the government from time to time, until the original town of Deerfield contained the whole territory which is now covered by Deerfield, Conway, Shelburne, Greenfield, and nearly all the town of Gill, which have at different periods, been set off and incorporated into separate towns, as follows: viz. Greenfield, June 9th, 1753; Conway, June 16th, 1767; Shelburne, June 21st, 1768; Gill, from Greenfield, Sept. 28, 1793. The population of original Deerfield in 1820, according to the census of the United States, was 6,756, including a small territory taken from Northfield and incorporated with Gill.

The first settlers of this town were constantly annoyed by the Indians; and more than once our fathers were obliged to abandon the town to savage conflagrations. In the spring of 1671, Deerfield, or Pocomptuck as it was then called, began to be settled, and a few houses were erected on the main street, on the town plat, which was then a forest. These settlers lived peaceably with their Indian neighbors until 1675. In September of this year, the town was attacked and seven of the inhabitants were killed; and in the same month, when going to attend public worship on Sunday, the inhabitants were again assaulted by the savages, but fortunately none were killed. The danger now rapidly increased, and the people found it expedient to remove to some place of safety. There was here, at this time, a quantity of grain and other provisions, which it was thought advisable to send to Hatfield. Capt. Lathrop, with about one hundred men, was sent to guard these provisions on their way to that place. They were attacked by about seven hundred Indians, supposed to be under the command of the celebrated Sachem, king Philip, at a place called Bloody-brook, and the Captain and ninety of his men, including teamsters, were slain in the engagement. Tradition informs us that immediately

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previous to this engagement, Capt. Lathrop's men felt themselves secure, stacked their arms, and went to gathering grapes, which grew upon vines upon the trees in that place, in great abundance. I will not vouch for the truth of the tradition. These men were principally killed on the banks of a brook, which was said at that time, literally to run with blood; hence the name of the place. Capt. Moseley, who was stationed at Deerfield for the protection of the inhabitants, hastened to the relief of Capt. Lathrop, but was too late to save him from defeat. Capt. Mosely was obliged to contend with the whole Indian force for several hours, when Major Treat, from Hatfield, on his way to Northfield, came up with one hundred men, consisting of English troops and Pequot and Mohegan Indians. They defeated and dispersed the enemy, after a hard-fought battle. Capt. Lathrop's men were all young, and the flower of the County of Essex. Their bodies were deposited in one common grave which is in the corner of the front door-yard of Stephen Whitney, Esq., of Bloody-brook. It is to be regretted that no monument is erected to their memories.

'When on Europe's red plains heroes gallantly perish,
Fame spreads her broad pinions their exploits to tell;
While the smooth chisell'd bust their resemblances cherish,
And well sculptured urns mark the place where they fell.

'Sleep soldiers of merit, sleep gallants of yore,
The hatchet is fallen, the struggle is o'er;
While the fir-tree is green, or the wind rolls a wave,
The tear-drop shall brighten the turf of the brave.'

Deerfield was now deserted by the inhabitants, and the Indians reduced the settlement to ashes.

In May, 1676, Capt. Turner marched from Hatfield at the head of about 160 militia men to attack a large Indian force stationed at the great falls, so called, on Connecticut river, in that part of Deerfield which is now Gill. He succeeded in surprising the Indians, and killing and destroying about three hundred men, women and children, with the loss of only one man on the first onset. Their encampment was above the falls. Many of them took to their canoes, and in the confusion, some of them were without paddles. They were all of them, with the excep-

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tion of one man, precipitated over the falls and drowned. The Indians now found Capt. Turner's force to be small; they rallied upon him and compelled him to retreat. They pursued him ten miles, continually harassing his men. His loss finally amounted to thirty-seven killed, and several wounded; Capt. Turner fell in the action. The remainder reached Hatfield. This was a bloody fray; but it has been faithfully and minutely delineated by my friend, Gen. Hoyt, in his Antiquarian researches, and my limits will not allow me to go into further detail. In consideration of the important services rendered by Capt. Turner and Holyoke and their men in this action, the government granted them and their successors, the township called Bernardstown, then Fell-town.

The following year, 1677, an attempt was made to resettle the town; very soon, however, a number of the people were slain, and the town was again deserted; but in the spring of 1682, the settlers returned, and for several years, were unmolested by the Indians. This year, the town of Deerfield was incorporated.

In March, 1686, Mr. John Williams was ordained the first minister of the Gospel in Deerfield. It seems that one of the conditions of the additional grants of land, after the 8000 acres was, that the inhabitants should settle a minister within three years, but they were so frequently molested by the Indians, that they did not comply with the condition for several years. But we cannot learn that any exceptions were taken by the government; so far from it, additional grants were afterwards made to the limits of the town. In 1693, the Indians again commenced their depredation upon the inhabitants, and continued to harass them for several years until 1704.

Let us now pause for a moment, and contrast our situation at the present day, with that of our unhappy ancestors, who have toiled and bled to transmit to us this rich inheritance,—these beautiful domains. We are now in peace and security, enjoying the blessings of national liberty, and surrounded by all that can make life desirable. The country is densely inhabited; our roads are good; and intelligence can be conveyed to the remotest quarter

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in a short space of time. We are in no danger of invasion from a foreign or a domestic foe. We need no muskets to protect us while at labor in our fields; no guards to defend us during the silent watches of the night. The blood of our sons no longer fattens our corn-fields; no savage war-whoop awakens the sleep of our cradles. Our fire-sides are our altars, and we can enjoy them unmolested. How different was the case with our fathers. The country was new; it was infested with savages thirsting for their blood. Their population was thin, confined to a few villages, and the inhabitants of these had as much as they could do to defend themselves from savage incursions. Few roads, but bridle and foot-paths, and all attempts to convey information, or calls for succor from, or to their suffering brethren, tedious and slow, at the imminent hazard of an ambuscade or life. Self-preservation was the first and almost the only law. It was unsafe to go into a neighbor's house without a musket, much less into the field. Their houses were within the rude walls of a fort, and almost the only communication between them, was by means of passages under ground from cellar to cellar. Centinels always guarded their houses by night. It was a state of continual jeopardy, and in the country of an implacable and vindictive savage foe. No succors could be received from government. Every thing depended upon individual exertion. Such was the situation of our fathers in this town, on the eventful morning of the first of March 1704, old style; one hundred and thirty years from the time I am now writing.

Just before break of day on the morning of the first of March, 1704, the town was attacked by surprise by two hundred French, and one hundred and forty-two Indians from Canada, under the command of Major Hertel and De Rouville, aided by two brothers. At the time the attack was made, the snow was four feet deep upon the ground. The crust was frozen sufficiently strong to bear the weight of men. At this time there was not a single settlement on the west side of Connecticut river, between Deerfield and St. Johns in Canada, a distance of three hundred miles. The attack was entirely unlooked

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for, and not guarded against. The centinel was unfaithful and had retired to rest. But few troops were stationed here at the time. Some parts of the town were defended by high pickets which extended round several acres, including many parts of the town street. These were called the forts, but some of the dwelling houses were calculated for defence, and were built in the form of block houses, with the walls filled with bricks, and proof against musket balls. The snow was drifted against the pickets, and the enemy entered in a body without difficulty. In detached parties, they broke open houses, and murdered the unsuspecting inhabitants in their sleep. Fortunate indeed were those who escaped. The tomahawk and war-whoop were the precursors of death.

A large party of Indians broke open the house of the Rev. Mr. Williams which stood a few rods off. He was in a profound sleep. The yells of the Indians awakened him. He snatched a pistol from his bed-tester—presented it to the breast of the foremost Indian, and snapped it. It fortunately missed fire, or he would probably have been massacred. He was bound and kept naked an hour, and his two infant children and one of his black domestics were murdered. The rest of his family, consisting of his wife who was just recovering from confinement, and five children, were taken prisoners.

The old house which is now standing, was attacked with fury. This was the largest, strongest, and best in the village. The door was filled with nails and firmly bolted, and it resisted their efforts. They then cut the hole in it which is still to be seen. Through this hole they pointed their guns and killed a woman who was dressing herself in her bed, in the corner of an adjoining room. This house is the pride of our village, as it recalls recollection pleasing, though mournful to the soul. It annually attracts the attention of many strangers of distinction. Many bullet-holes are to be found in various parts of the house, and in many of these holes, the balls still remain, and are to be seen. The Indians finally gained possession of it, and kept it, together with the old meeting-house, as a depot for their prisoners till they left the town.

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This attack was sudden and furious, and much bravery was displayed in the defence; but the means were inadequate. Seven men and a few women defended a house about fifty yards from the old one against the combined force, during the whole time of the engagement, and killed several of the enemy. Great efforts were made by them to carry the house or set fire to it; but they were all resolutely defeated. The women, with the intrepidity of Amazons, were busily engaged in casting bullets for the supply of the defendants. The house unfortunately took fire after the Indians left the town with their prisoners, and was consumed. All resistance now ceased, for what could be done against such a disparity of numbers, and by men unprepared for the assault. All human efforts were unavailing.

Major De Rouville collected the prisoners and plundered and burnt the principal part of the houses, and commenced his march with them to Canada. I shall not attempt to portray the horrors of that dreadful scene. Language is inadequate to convey the realities of that heart-rending transaction, although they have been described in letters of blood.

On their retreat with the prisoners the enemy were attacked in the meadows by a party of men from Hatfield, and some others, who had received information from some of our men who had escaped from the massacre at the onset, and a sharp contest ensued, which compelled them to retire with the loss of nine of their party. This engagement was near causing the death of all the captives. The bloody word was given by Rouville to tomahawk all the prisoners; but the messenger was killed before he conveyed his orders, and the French commander soon countermanded them.

The number of prisoners taken in this memorable and bloody action was one hundred and twelve, including three Frenchmen who resided here. The number of killed was twenty-seven. The enemy lost about the same number. It has been said, that if the Indians had failed in their first attempt to carry the fort, they would have been compelled to have surrendered their whole army at

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discretion, for their stock of provisions was entirely exhausted, and to return would have been certain destruction, as there was no settlement until they arrived at St. Johns, in Canada. The whole number of inhabitants in this town at this time was about two hundred and eighty.

Gen. Hoyt observes:—'Soon after the action in the meadow, Rouville commenced his march to Canada. Most gloomy was the prospect of the captives; many were women; these under circumstances, requiring the most tender treatment; some young children, whose tender frames could not sustain the fatigues of a day; others, infants who were to be carried in the arms of their parents, left on the snow, or knocked on the head with the tomahawk; and several of the adult males were badly wounded. Under these melancholy forebodings, others, no less appalling, presented. The distance to Canada was not much less than three hundred miles through a country wild and waste; the ground deeply covered with snow; the weather cold and inclement, and what appeared impossible to surmount, provisions were to be procured on the route. At the commencement of the march, the murder of an infant was a prelude to the cruelties that were to be expected from the blood-thirsty Indians.'

I shall not attempt to depict the horrors of the march to Canada, nor to point out the sufferings of the prisoners. I shall pass over the cruel murder of the wife of the Rev. Mr. Williams, on the second day of the journey, whose body was afterwards found, and deposited in an old burying-ground, where a monument is erected to her memory; the starving to death of two of the prisoners at Coos; the sufferings of Mr. Williams, both bodily and mental, and of the other prisoners, during a captivity of more than two years in the cold and inhospitable regions of Canada. Nor shall I dwell upon the anguish Mr. Williams endured in being obliged to give up a beloved daughter to the savages, who became an Indian in her habits, married an Indian, and some of whose descendants have been liberally educated, and have frequently visited us. These events, he and later historians have delineated with able pens, and their accounts should be in the hands of all who feel interested

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in their native town. Suffice it to say, that two years after the destruction of this place, a government ship was sent to Quebec by Gov. Dudley, by which fifty-seven of the captives were obtained and conveyed to Boston, and ultimately to Deerfield, among whom were Mr. Williams and his remaining children, except Eunice, who married the Indian, who assumed the name of Williams. Mr. Williams at this time commenced preaching at Deerfield, and continued his useful labors here till the year 1729, when he died.

[TO BE CONCLUDED IN OUR NEXT.]

LETTER TO THE EDITOR.

The following is from Daniel J. Brown, formerly editor of the Naturalist, the Etymological Dictionary, a valuable work on Forest Trees, &c., now on his travels.

OROTAVA, TENERIFFE, 25th August, 1833.

My Friend S.

BEFORE I enter into the details of my situation, I beg leave to express my gratitude for the friendly interest which you have ever taken in my behalf, and to assure you that I shall cherish the remembrance of it as long as I live. Such acts of kindness, so flattering to one's self-love, create the deepest and the most lasting impressions on the heart, and cling to it when other things have long passed away.

Well, to begin. I am arrived, at length, at the spot so long and so eagerly desired. How different is it from what the most cool and temperate imagination had figured it to be. Instead of a high-peaked promontory, jutting out of the sea, with a few trees and vines about it, and a small town at its bottom, I behold a majestic mountain, whose sides are covered with extensive forests, and whose top towers above the clouds. Around its base are lesser mountains and hills, intersected by deep narrow ravines, which are lined with fruit and forest trees, and are clothed with eternal verdure. Orotava comprises a large, elevated champaign, some leagues in extent, interspersed

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with compact villas and detached dwellings, which are encompassed by delightful vineyards and cornfields, that yield, at once, the choicest and the most varied fruits. If I were to describe it in a few words, I would say that it is a vast garden, decked out in aromatic groves, which realize the *beau ideal* of Paradise. The sea-shores, constantly dashed with snow-white surf, are bold and precipitous at all points. In short, there is no region, perhaps, on the globe, that presents a spectacle more beautifully romantic and wildly picturesque than the one which I at present enjoy.

As it is next to impossible for me to relate all the occurrences of my travels, may I ask your acceptance of a paper in which will be published a faithful abstract of my Journal, which was invariably written on the spot at the close of each day. I expect to remain a few weeks on this Island and then embark for Spain and proceed directly to Italy. It will afford me pleasure to receive a line from you at Messina, informing me how you prosper, and whatever new has occurred.

To the Editor of the Tracts and Lyceum.

In the Lyceum for 1st of March, I observed my answer to the call made on a Mr. Thompson by 'S.' relative to the discovery of the Quadrature of the Circle. And in a Nota Bene, quere is made whether A. Y. might not have mistaken, in setting down his formula; as from the researches upon the subject, no such characters were to be found; and hence, requiring farther explanation.

I acknowledge the article was written in extreme haste, and without the care that should have been bestowed on so important an article, but cannot admit that the formula was not as correct as it was intended to have been; nor will I allege that it is not all that it purports to be.

Perhaps the editor did not observe whence it was taken, viz. from the book of Rational Analysis, which I have never seen except in manuscript. If farther extracts

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shall be made from time to time from the same book for the Lyceum, or for some other periodical, with appropriate explanations and comments, it is hoped that too much time will not be spent in searching for similitudes in works already in print. But I perceive that my want of care in writing has caused some few typographical errors, only one or two of which I shall name; and those seem rather too immaterial to notice.

'The groves of ancient colleges and halls,' might give a more pleasing sensation than their *graves*. But what more particularly affects me, is, that there appears to be no *force* in the material lines contained in the article as printed. There certainly was in the poetry as written, if I recollect right; but the compositor has wholly abstracted the *force*, and has put *form* only in lieu of it. Now, as poetry cannot be *truly sublime* without *force*, I will suggest to the reader (if any) to dispense with *form* in the metric lines, and supply its place with *force*, and he will thereby much improve the poetry. A. Y.

Certainly our correspondent is a very ingenious one. No person can write in this way, without being an original thinker. We foresee his future elevation and influence, though now young and inexperienced, if he constantly bears in mind that industry is the power that keeps the intellectual world in motion.

ATOMIC CONSTRUCTION OF MATTER.

It seems highly probable that matter is composed of primitive particles or atoms. Not *indivisible* atoms, or destitute of parts and finite magnitude, but which *never are* divided, nor can be by human agency, or without altering the constitution of matter itself.

The chymist has in his science acknowledged the existence of such atoms, and the little we know of, philosophy seems to require such a hypothesis on which to found explanations of circumstances which admit, on no other principles, of any clear exposition.

The form of these particles, as I should prefer to style them, instead of atoms, may be conceived to be spherical.

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This coincides best with the fact of the easiness with which the component parts of fluid matter move among themselves. But possibly in different species of matter, the form as well as size may vary. To these two circumstances in part, we may attribute the cause of the existence of different species of matter.

To these particles we attribute magnetic polarity. In the composition of matter all the particles are arranged with reference to their poles, and in consequence of this, when undisturbed, regular forms or crystals are produced.

It seems proper that it should be explained why, on this principle, all bodies are not equally magnetic.

In the first place we state that the particles of every mass of matter are not regularly arranged. Numerous may be, and are, the accidents sufficient to disarrange them. The particles of fluids are moved by the slightest agitation. Violent shocks break and dismember the hardest mineral substances.

Secondly, that a body may be magnetical, it is necessary that its particles be so arranged that all the poles of one class shall unite their energies in one point, which will be the pole of the whole portion of matter. This may not always be the case, or rather it happens in such a way that the effect is destroyed. In regular crystals, the determinate point of polarity is most probably in the centre, which will cause the magnetic influence of that body to be in equilibrium.

But why do not the particles arrange themselves in conformity to the magnetic influence of the earth itself, and thus become themselves magnets? In answer to this, we say that those of some substances do thus. Probably all bodies are not equally susceptible of this influence, on account of their magnetic force not being equally active or powerful. And it reqnires, probably, that a greater portion of the particles should be already in *some* magnetic plane of the earth, in order that the whole should arrange themselves with reference to that plane. Thus iron bars, when placed in particular situations, and in no others, acquire polarity without the application of any other means.

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[Furnished for the Tracts and Lyceum.]

POPULAR BOTANY.—No. I.

WHAT IS THE RIGHT NAME OF IT? This question, when asked concerning a plant, is frequently very difficult to answer in a satisfactory manner.

The confusion of names of plants in various districts, is almost without parallel. Every township in our country, perhaps, has its peculiar botanical dialect. Whilst one plant receives four or five distinct names, as often, one and the same name is appropriated to as great a number of distinct plants. Although there are many *names* of plants common to this country and England, it is unfrequent that these names are appropriated to the same plants, except some well known culinary vegetables. This is a fruitful source of error and misapprehension. A reader on this side of the Atlantic, perusing European works, unless he be well informed on this subject, will be often led to mistakes, on account of attaching false ideas to the names of plants on which the writer converses.

A few instances will suffice, to show how far we have deviated in our popular nomenclature from our English brethren.

In England, the term primrose is applied to a plant which is not a native of our climate.* Here, in some places, it is applied to a species of *rose*, otherwise called cinnamon rose. The term 'cowslip,' which in England denotes a *species* of their primrose, is here applied to a meadow plant, which the English term 'Marsh Marygold.' The name of 'Saffron' is applied to two plants which have but a *single property in common*, which is, that of producing a yellow dye.

Equally intricate and ambiguous is the *system* of local terms, even if we confine our observations within the limits of our own State. Whilst but a *small part* of American plants are known by any popular name, many of those which have names, have them only as local appellations. Not unfrequently the name of a plant conveys altogether a

* Some species of primrose, differing from the English, are found in our Western States.

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mistaken idea of it, either in regard to its qualities and uses, or its classification and relations with other plants as congeners.

Such evils can be more easily pointed out than remedied. Botanical knowledge, especially of that very kind which is most needed, is less diffused through our country, than any other kind of scientific information. The Botany usually studied, and with which most students seem to content themselves, is merely a knowledge of words and terminology; and the great endeavor seems to be to know *the most plants*, instead of the most *about* plants.

The only remedy to the above mentioned evils must be to diffuse *practical* information about plants more generally among the people. The knowledge of *Monandria* and *Polyandria* is, in itself, of very little importance; but to know *how* and *where* to find a useful plant, which is unknown for want of a name, and to know *what is its name*, may be a very important portion of knowledge.

One grand difficulty in the way of a knowledge of Botanical names is, that they are all in Latin or some other *more* barbarous dialect. This is the grand opprobrium of our Botanical system. In the sixteenth century, it was well enough that books of Botany should be written in Latin, as few read them, except physicians, even among the learned; but in the *nineteenth* century, it is ridiculous, that while everything else is in the vernacular tongue, Botany should still be in Latin.

This is, without doubt, one reason why many are deterred from the pursuit of this delightful study, and surely, the idea is not very consoling, that before fully comprehending it, we must submit to a course of Latin.

The French have *Frenchified* the Latin terms of Linnæus, but this the stiffness of our northern dialect will hardly permit.

The Latin language is so rooted into the very foundations of the science, that to disencumber it of its learned dress would require of the innovator, the task of almost new-making the whole science. Many of its terms are untranslatable into any thing like convenient or pure English, and when translated, many would lose the spirit of the original.

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One reason why the Latin names are so far retained is, that our language is not sufficiently *ductile* to furnish, easily, compound terms so peculiarly expressive and appropriate. To such a degree is this difficulty felt, that in every period, scientific terms have been borrowed from Latin, rather than to form cumbrous and inelegant compounds out of our own materials. But there are many terms applied in the descriptions of plants which are unnecessarily retained in Latin. The regular Latin names seem to be necessary as a kind of general language to Botanists, and to abandon them would be to throw the science into more difficulty than would be gained by the adaptation of the study to the understanding of the people. When the people get hold of a name, they are apt so to misapply it, or to corrupt it, as to unfit it for any other use but that to which they have corrupted it or falsely applied it. The Latin terms are needed as a general standard whereby each nation is to compare and test its national and peculiar nomenclature. What we want, then, is a purified set of English terms for the plants which are or may be known to us, which shall be accordant with the principles of Botany, comparable with the Latin system, which shall convey no erroneous ideas and lead to no erroneous impressions, and which shall be generally known, or at least easily accessible to the mass of the community.*

CIVIL ARCHITECTURE.

THE Chinese exhibit a peculiar taste in the structure of their public edifices, which is certainly unlike the rest of

*I would propose that a Literary Scientific Tribunal be established among American Botanists, who shall fix a nomenclature of American plants, and make it generally known. They should be considered as having the power to FIX what the name of a plant shall be, taking into account the name it already bears, and providing that the name shall be appropriate to the plant to which it is given. Appeals from their decisions might be made by stating objections and thereupon calling the Tribunal to reconsider their decisions. Any one should have liberty to propose names for the consideration of the Tribunal.

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the world, and yet there is a beauty and air of grandeur in some of their most ancient temples, that calls forth the highest admiration of travellers. Among the most celebrated temples in China, is the porcelain tower of Pekin, a very exact drawing of which accompanies these remarks.

We had transcribed, from a popular work, a sketch of what are denominated the *towers of England*, which is really an interesting article, but a want of room must defer it for the present.

WHEAT INSECT.

An insect, called the *tipula tritici*, or wheat insect, has destroyed, in some places in England, about one twentieth part of the produce. An insect, called the *ichneumon tipula*, deposits its eggs in the larva, or caterpillar, of the wheat fly, and this destroys it. Dr. Darwin gravely pro-

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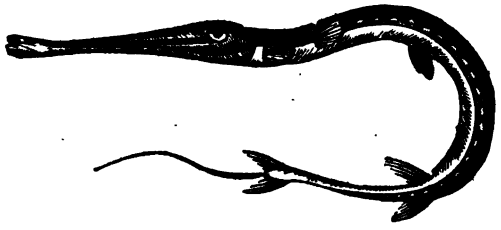
poses, in his Phytologia, to counteract the pernicious effects of insects which produce blight, by propagating the larva of the aphidivorous fly. It is not yet settled whether the Hessian fly is of foreign or domestic origin; although a species of tipula, yet it is not the one just mentioned, as I am informed. The farmers on Long Island complain of the septennial ravages of an insect which destroys their barley, and which they denominate the army-worm, from its numbers.

TOBACCO-PIPE FISH,—FISTULARIA TABACARIA.

Gen. Fistularia.



On the Atlantic coast of the United States, as far north as Portland, in the state of Maine, an occasional specimen of this curiously constructed fish is thrown upon the beach. In no instance, as far as our own observation extends, has a live specimen been seen in the New England States.

Its habits are entirely unknown. It is presumed, however, that the tobacco-pipe fish remains at considerable distance from the coast, in deep water, though organized for swimming very near the surface, where it probably lives on aquatic insects, which are captured by darting the long tube-like mouth at them from below. After severe storms only, are they ever found in this section of the country, which shows pretty clearly, that they were forced from their primitive haunts by a power that could not be

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resisted. Any facts, illustrative of their character, from those who have investigated the subject, will be interesting to naturalists, and we therefore solicit them.

ORIGINAL MISCELLANY.

NEW BOOKS, &c.

The Young Man's Guide, 2d Edition. Lilly, Wait, Colman and Holden. 316 *pp.* 12*mo.*—One of the best little works issued from the press in 1834. In the first place, Dr. Alcott, the author, is an excellent man, and all his literary pursuits have for their object the happiness and moral elevation of those who study his writings. The young man who wishes to be all that an indulgent parent desires, and what the law of God requires of a rational being, should possess this *unerring Guide.*

Memoir and Poems of Phillis Wheatley, a Native African and a Slave; Servant to Mr. John Wheatley, of Boston. Geo. W. Light, Boston.—The story of Phillis is a melancholy one. She was born in a land of heathen darkness, lived a slave, and though her skin was black, and she was further degraded by being married to a brute, the powers of her mind were transcendently original and powerful. Her poetical talents were highly respectable, and, considering her abject and humiliating condition, and the poor advantages for acquiring even a grammatical knowledge of language which her station afforded, her compositions are the sweet breathings of a virtuous and exalted soul, which will remain the indestructible monument of her talents. A correct and well executed Portrait of Phillis is attached to the volume.

Journal of a Residence in Scotland, and a Tour through England, France, Germany, Switzerland, and Italy, with a Memoir of the Author, and Extracts from his Religious Papers, compiled from the Manuscripts of the late Henry B. McLellan. By I. McLellan, Jr. Boston, Allen & Ticknor.—The early death of this promising young gentleman was a heavy affliction to his family, and a loss to the world. The beauty of the style, the playfulness of the journal, and

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the close observations of the tourist, from whose eye not a mote escaped, will recommend the volume to every class of readers. Its value is not a little enhanced by the rising celebrity of the talented editor, a surviving brother of the lamented author. Before leaving it, with the expectation of giving a more elaborate notice of the volume at a more convenient time, a hope is indulged that its circulation will be general among thinking people.

Caroline, ou L'Effet D'un Malheur; a Tale of Misfortune for Young Persons, in French, by Madame Guirot.—This is the history of a spoiled child, who was finally made better by the death of her mother. For young persons, especially those engaged in studying the French language, we strongly recommend this book, on account of its moral tendency and the aid it will certainly afford youth, in acquiring the French language.

Sacred Annual.—Excellent.

Turner's Annual Tour.—Have not read it. Mem.—nothing to say.

Gallery of Graces, Part 7.—Beautifully executed.

Landscape's Illustrations of Byron, No. 20.—Buy, and then judge of its merits.

Portrait Gallery of Distinguished Females, No. 22 *and* 23.—Elegant pictures of ugly faces.

United States Review, No. 1.—Can give an opinion of its value a year hence.

Aids to Mental Development, by a Lady of Philadelphia.—The design is good, and therefore its influence will be highly beneficial on the minds of those who study the text with reference to intellectual improvement.

Memoirs of Dr. Staughton.—The subject of the memoir was an eminently distinguished divine, who practised the precepts which he recommended to others.

National Gallery of Portraits, Nos. 8, 9 *and* 10.—Our only regret is, that we cannot afford to own it. Whoever can, should encourage this first attempt to collect and preserve the pictures of those who have been variously distinguished in the annals of this new, but gigantic country.

Library of Old English Authors.—Very curious and valuable.

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Aldine Poets, No. 28.—The writings of the facetious Dean Swift, a wit, a poet, a scholar, philosopher and divine. The entire series are needed in all well selected town and social libraries.

Maps to the Library of Useful Knowledge.—Very well.

Horticulturist, No. 3.—Purchase before June.

Christian Ethics.—Very valuable to every professor of religion, and to such we can heartily recommend it.

Miscellany of Natural History.—Like a gem in the sand, it remains to be discovered.

Negrist's History of Herodotus.—Herodotus, by Herodotus, is preferable.

Rev. T. Scott's Theological Works need no commendation.

House Keeper's Guide.—A hope is entertained that this will be widely disseminated. Surely, there is need enough of instruction these hard times, in domestic economy.

Works of Hannah Moore, with a Memoir.—Above all praise:—were it distributed at the expense of the public chest, the moral effect on the people would raise the character of the Legislature for wisdom.

New Readings of Old Authors—Caricatures.—More attic salt necessary.

Writings of Robert C. Sands.—He was an ingenious man, and a beautiful writer, who would have been more distinguished had his life been spared.

Lives of Eminent Painters.—Amusing and instructive.

Blake's Botany.—Nothing remarkable.

Maj. Downing's Letters to Dwight.—Miserable attempts at wit.

Lucia, the Betrothed.

The Alcestis of Euripides, by Prof. Woolsey, of Yale College.—A very learned and critical production.

NOTE.—Indispensable duties have prevented us, in this number, from giving any thing more than the titles of new publications which have appeared since our last. Most of them may be read with profit; some of them will afford amusement, and all of them either supply new ideas or strengthen old ones. Allen & Ticknor, at the corner of Washington and School Streets, have an immense collection of works in every department of human knowledge, to whom we can conscientiously recommend the patrons of the Scientific Tracts.

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Scientific Doings.—Mr. Fowle, the successful and popular lecturer on Phrenology, is doing himself honor. His research, perseverance and industry promise well for the future. Unaided by those who suppose themselves adepts in sciences of which they are profoundly ignorant, his chance for a niche in the temple of fame is far greater than those genteel, ephemeral dunces of the day, who elbow themselves to the highest seats, are willing to admit.

On the whole, this must be regarded as a poverty-stricken season,—inasmuch as those who have been known to utter wise sayings, make no attempts at originality in the way of science. All lectures before the different societies, which have been kept up during the winter, with great spirit, in this city, have been suspended, on the Ides of March. Approaching spring probably has a similar influence on our own species that autumnal blasts have upon hybernating animals, viz. a sleepy sensation gets the ascendency, and hence all scientific essays written for effect sake, partake of a drowsy, stupid character. At Hingham, Plymouth, Charlestown, Quincy, Medford, Cambridge, Salem, &c., the Lyceums are ably sustained. We understand the lectures have been of the first order. This is the way to raise the moral standard of the people, by exciting that spirit of inquiry which can alone elevate the intellectual condition of man.

Protection for the Eyes of Birds.—Were birds without the third eye-lid, called membrana nictitans, which shoots across from one angle to the other, under the external lids, it is probable they could not fly against the direct rays of the sun's light. As the apparatus of vision is the same as in man, a palsy of the retina would be induced as quickly in the bird's eye, as in our own, by looking a short time at the meridian sun, were not the third lid interposed. No instance is recorded of a blind wild fowl from such influences, and it is reasonable, therefore, to suppose, that by this natural blind, the organs are preserved from inflammations, arising from a cause, that would inevitably produce total blindness in man.

An ingenious method of Writing.—At the Hospital of Invalids, in France, is an officer, who suffered the amputation of both arms within about two inches of the shoulder joints, many years ago, greatly distinguished for his skill in penmanship. Around his body is a wide leather strap, having a horizontal iron bar jutting

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from it in front, into which a pen is placed, by some simple contrivance. The paper being laid before him, he writes not only beautifully, but with extreme rapidity, by the oscillatory, or in plain English, wriggling motion of his body.

ADVANTAGES OF AN EDUCATION.—The late celebrated Alderman Curtis, of London, within a few years, gave, at a public table, the following sentiment:—'To THE THREE R's—READING, RITING, AND RITHMETIC.' On another occasion, he was no less felicitously in character—'To THE FEMALE LADIES OF LONDON.' Mr. Curtis possessed great wealth,—had a fine person, and associated with distinguished men, who made him the laughing stock of the United Kingdom.

A VALUABLE DISCOVERY.—Good cross hairs for telescopes may be obtained from the nest of a web-worm, which makes its appearance upon birch, wild cherry trees, &c. in the latter part of the summer season. The diameter of these webs is about one third of that of the web of the silk-worm.

PAPER FROM ROTTEN WOOD.—Mr. Brand, in a letter to the Royal Academy of Bordeaux, says that he has manufactured a coarse paper from rotten wood of the *Pinus maritima*. He suggests its use instead of pasteboard for book-binding.

GRESHAM COLLEGE, *Eng.*—The lectures there, says the Literary Gazette, have long been little better than farces. The same might be said of some of our own mighty literary institutions, which are only tools in the hands of a few *lairds*.

SIR JOHN HERSCHEL.—At a recent sitting of the Academy of Sciences, the gold medal of the value of 650fr. beqneathed by Lalande, was adjudged to Sir John, for his discoveries relative to double stars.

MAPS.—Dr. Berghaus, of Gotha, is now engaged in publishing a set of large maps of the different parts of the globe.

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A SPLENDID GIFT.—The Emperor of Russia has presented to the French Institute, (*Academie des Sciences*) a complete collection of all the minerals found in Russia.

ETRUSCAN ANTIQUITIES.—The king of Prussia has recently purchased of Dorow, the celebrated archæologist, his celebrated collection of Etruscan antiquities.

UNIVERSITY OF BERLIN.—During the last season, the University of Berlin was attended by 1832 regular students, besides five or six hundred attending particular courses of instruction. The reputation of Professors *Schleiermacher and Neauder*, in theology, is very great.

A NEW WORK.—An introduction to *Mythology*, viewed in connection with *Natural History*, is in preparation by Dr. Schweigger of Halle.

ARCHITECTURAL MONUMENTS OF SICILY.—Saveris Cavalleri, a young artist of Palermo, has been employed by the Duke of Serradifalco, to illustrate the architectural monuments of that country. The antiquities of Selinuntium, being part 1st, is in press.

ORIANI.—A monument is about being erected at Milan, in memory of Barnaba Oriani, the celebrated mathematician and astronomer. He gave all his vast property for promoting the advancement of Science.

TURKISH DICTIONARY.—M. Kieffer, who died not long since, had in preparation a Turkish and French dictionary, which will be speedily published by M. Bianchi, author of a Turkish and French vocabulary.

A PREMIUM.—Prof. Fraehn has induced the St. Petersburg Academy to offer a prize of 200 ducats for the best history of the Moguls in Russia.

DISTINCTION.—Manuckjee Cursetjee, a Parsee of distinction, has been admitted a member of the Bombay branch of the Royal Asiatic Society.

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TO CORRESPONDENTS.

'L. L.' must have noticed that we are particularly partial to Mathematical papers, and cannot, therefore, have any hesitancy in making communications to this Journal.

'Salvo' should be more explicit: the Italian's Epitaph ran thus:—'I was well;—I wanted to be better;—I took physick,—and here I am.'

'George S. S.' The editor declines the publication of this paper, for two reasons, viz: in the first place, it is not worth the trouble; and in the second, critical readers (there being no others) would be provoked to tell us so ———.

'Franklin' never presumed to advance such a notion as our correspondent would fain induce us to believe. Possessing the whole of his writings, nothing could escape us, so extraordinary in character.

'M*****.'—A lady's hand writing, we imagine, from the delicacy with which an ingenious theory is presented. Another evidence of its origin, is a postscript, characteristic of the sex, who thus invariably contrive to have the last word.

Mr. Barnes has no tact for composition, though he may love music.

Mr. 'I. W.' of Hanover, N. H., Mr. Drake, of Albany, 'J. J.' of Portland, Me., and Dr. T. of Savannah, Geo., will please accept all that an editor is ever able to give,—thanks.

Samuel F., Esq., together with his talented neighbor, whose contribution came in the same envelope, deserve the highest praise for their exemplary industry.

'A Bookseller' may roll the whites of his angry eyes another way: owing none of the craft any thing but good will, we shall cut and hew all monstrosities in the shape of books, alike regardless of 'high dudgeon,' or 'liberal patronage, versus thumb-screws.' 'Let the galled jade wince.'

Note.—A friend has sent us six sheets of manuscript, on the life of the great Naturalist, Linnæus, which we are desirous of publishing,—but before it is done, we wish the writer to understand distinctly, that he cannot be paid for it.

Vegetable Physiology, No. I,—by an able and intelligent writer of Selinsgrove, Union County, Pennsylvania, is on the table, and were it possible to assist him in the way he proposes, nothing would give us more pleasure. 'An honest man is the noblest work of God,' says the poet. The conductor of this Journal is no way interested as a partner. The Publishers are the exclusive owners. All matters of business, therefore, are to be addressed to those gentlemen. If Mr. G. A. S. who is also an Agent, will consent, every word of his beautifully written thirteen folio pages, which came in different packages, shall be printed,—but we cannot pay him anything, being poor ourselves. The manuscript is too good to be lost, and yet we are too proud to beg for the succeeding numbers. What shall we do? As it is your privilege to frank, pray answer the question by a return post.

'Observations on Vegetable Economy' will appear in the No. of April 15th, if room can be found; otherwise, May 1st, as a May-flower.

Dr. W. K. is prompt; donnez-moi du pain.

'S. R. C.' should have prolonged the Inquiry: all is well that ends well.

Mr. Coffin, of Warren, R. I. thinks poorly of our taste if he supposes we might possibly consign his well written manuscript of sixty-one pages on eclipses, to the flames. All the diagrams will be put into the engraver's hands forthwith, though the publication must necessarily be delayed eight or ten weeks, till earlier contributions are disposed of.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

APRIL 15, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

TRADITIONARY AND HISTORICAL SKETCH OF THE INDIANS:

Or, an inquiry concerning the natives who formerly resided in the vicinity, and in the original borders of the town of Deerfield, in the state of Massachusetts; with a historical sketch of ancient Deerfield.

[CONCLUDED FROM PAGE 213.]

DEERFIELD was rebuilt soon after this destruction, and from that time till the year 1715, notwithstanding there was peace between France and England during part of that interval, the war was carried on, with some few exceptions, with little success by the Indians. I pass over the various skirmishes which took place between our people and the Indians, from the time of the sacking of the town to the Barrs fight in 1746.

The following relation was given me by Miss Eunice Allen, who, in August, 1746, was tomahawked by an Indian, but survived the cruel wound. Miss Allen was upwards of eighty years of age when she gave me the history. She had been confined to her bed more than sixteen years, but her recollection was perfectly distinct and clear. She remembers the events of that day (August 25th) as perfectly as if they had taken place yesterday. Her account agrees with that of the Rev. Mr. Taylor, published in 1793.

Fort Massachusetts, at the western foot of Hoosick mountain, about thirty miles west of Deerfield, was taken on the 20th of August, 1746. After the capitulation, a

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party of fifty Indians, meditating an attack upon Deerfield, came down upon the borders of the meadows and reconnoitered them. They first examined the north meadow, and then the south. Finding a quantity of hay in the south meadow, two miles south of the street, and supposing that our people would be there at work the next day, they concealed themselves in the brush and underwood, upon the borders of the adjoining hills. The next day, ten or twelve men and children, the men armed with guns, which they always carried with them, went into the field and commenced their labor. A Mr. Eleazer Hawks was hunting partridges on the hills where the Indians lay, that morning. He saw a partridge and shot it. This alarmed the Indians, who supposed they were discovered. They immediately killed and scalped Mr. Hawks, and then proceeded to attack the workmen. They fought some time, which gave some of the children an opportunity to escape. Mr. Allen, father of Miss Allen, resolutely maintained his ground, in defence of three children who were at work with him in the field, until he killed one or two of the enemy. When he was overpowered he fought them with the breech of his gun, but he was finally shot and horribly mangled. The shirt which he wore on that day, torn with many balls and gashed with tomahawks, is still to be seen as a curiosity, either in the museum, in Deerfield Academy, or at the house of his grandson at the Barrs. In this engagement three men and a boy were killed; one boy was taken prisoner, and Miss Allen was wounded and left for dead, but not scalped. In endeavoring to make her escape, she was pursued by an Indian with an uplifted tomahawk. She was extremely active, and would have outran him had he not fired upon her. The ball missed her, but she supposed that it had struck her, and in her fright she fell. The Indian overtook her and buried his tomahawk in her head, and left her for dead. The firing in the meadows alarmed the people in the street, who ran to the scene of action, and the Indians made a hasty retreat. Miss Allen was passed by a number of people, who supposed her to be dead. At last an uncle came to her, discovered signs of life, and conveyed her home. Her

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wound was dressed by Dr. Thomas Williams, who took from it considerable quantities of brain.

After this time, I believe, the inhabitants were unmolested by the Indians. It is not my intention to follow them any farther in their wars, than is necessary to elicit certain traits in their character and habits; for in these we shall be able to discover, nowithstanding their innate ferocity and barbarity, much to admire and imitate. Let us not be too severe in our judgments against them, for their cruel treatment of our fathers. Place yourselves in their situation, and how different would be your conduct? They were in the rightful occupation of a beautiful country, which descended to them from the common Father and Creator of us all; and their possessions were as dear to them as ours are to us. Although they are despised and degraded, and driven like wild beasts to distant parts of the country, they still retain a lofty elevation of character, and an independence of soul, which no privations or difficulties can subdue. In proof of this, you will pardon me, I presume, for giving you the following account of some of their manners and customs. They are principally traditions from some of our aged citizens. I will not vouch for the absolute certainty of all the statements, though the relators believe and assert that they are substantially correct.

Before the Europeans arrived among them, it is probable, they knew nothing of the use of iron, that noble metal, by which the arts have been so much advanced. The numerous specimens of hatchets or tomahawks, gouges, chisels, &c., rudely fashioned of stone, tend to show that they were ignorant of this metal.

Their hunting utensils and implements of war, were war-clubs, tomahawks, scalping-knives of stone, and bows and arrows, which they managed with great precision and celerity. Their arrows were either of the cat-tail flag, *(Typha latifolia)* or of wood, at one end of which they strongly tied a piece of flint, or red or black jasper, shaped like a spear, and at the other they affixed a feather from the wing of a bird.

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Their fish-hooks were of bone, rounded, polished and barbed at the point: sometimes the barb was of hard wood. Their lines were made of the fibres of animals, or of Indian hemp, *(Apocynum cannabinum.)* They used spears made of bone for the purpose of stabbing shad. The bone, sharpened like a spear, was tied upon the sharpened end of a pole. It was tied firmly upon the pole, above the spear, and loose around the spear. This they thrust through the shad, and the bone became loose, and left the fish dangling between the spear and the pole, suspended by the cord. Their method of taking salmon was by means of nets, affixed to split poles, somewhat in the shape of a basket. They generally fished for salmon at the foot of ripples.

Their wigwams, or huts, were composed of four crotched sticks, stuck into the ground, and covered with the bark and boughs of trees. The floor was of poles, covered with the small boughs of trees, commonly the hemlock, *(Pinus Canadensis.)* The fire-place was in the centre of the hut, and there was an opening in the top of the hut to carry off the smoke. In winter, their beds were of the skins of animals killed in hunting, and in summer, the boughs of trees. They slept round their fires, with their feet towards them.

Their method of kindling or exciting a fire was said to be by violently rubbing two hard pieces of dry wood together. I have seen pieces of their wood thus rubbed, as hard and smooth as glass.

Their food was the flesh of animals and fish, either eaten fresh and roasted in the ashes, or cured by smoke; I believe without salt. Among vegetables, they were peculiarly fond of Indian corn, parched and pounded, and moistened with water; and of corn and beans, of which they made a favorite dish called succotash, which is also a delicacy upon our tables. They were also fond of squashes. They had no particular hours for eating, but only satiated their appetites when the calls of nature invited them.

After the English settled among them, they became excessively attached to rum, which they called skaurrett.

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Instances are related, when, after a nocturnal *pow-wow*, a whole village have lain dead drunk at a time. In one of their midnight orgies, two miles and a half south of the town street, they exhausted their canisters, and all became drunk but one. He came to the house of a Mr. Allen, about half a mile from the scene of riot, and offered him a fine buckskin for a gallon of cider, that he might become as drunk as his companions. It was refused him. A few days afterwards, the man who refused the cider offered a handsome sum of money for the buckskin. The Indian would not part with it, but replied, 'You fool, a few nights since you might have had the skin for a gallon of cider; now you shall not have it at any price.'

Their clothing was made of the skins of animals. They generally wore long stockings, made of deerskins, tied about half way up the thigh. They also wore moccasins curiously ornamented with bells, hedgehog quills, and rattlesnake skins, colored red, blue and black. In deep snows they wore snow-shoes, made of an elliptical bow of walnut wood, curiously netted with raw skins. With these they could travel on the snow with almost as much facility as upon the naked ground. They wore a belt of skins with the fur on, about the middle of their bodies, and sometimes the women wore a mantle or cloak of skins across their shoulders. They were acquainted with a process for tanning leather. Specimens of their deerskins, finely tanned, and made into moccasins and money-purses, are to be seen in the Museum at Deerfield Academy, and a money-purse made of the skin of a very large rattlesnake, *(Crotalus horridus)* with many other articles of Indian construction.

They were acquainted with the art of coloring or dying. Specimens of permanent colors, particularly blue and red, are to be seen in the Museum above alluded to.

Their cooking utensils were pots, formed either of soft clay and sand, baked in the sun, or of steatite or soapstone, which is found upon the mountains southeast of Connecticut river, in Shutesbury, twelve miles from this town. Their mortars were of fine sandstone, or of steatite rock. In these mortars they broke or bruised their corn for samp

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or hominy, of which they were very fond, with their stone pestles.

The Indians were strong, athletic and nimble, and an inquiry concerning their method of practice in the cure of diseases would be interesting. That they were in the possession of a knowledge of the virtues of certain plants which could arrest the progress of the poison of the deadly rattlesnake, to which they were often exposed, as formerly rattlesnakes were found here in great abundance, I do not doubt, from the information I have received. A tradition handed down from the natives informs us that it is the leaves of the common ash, *(Fraxinus acuminatus)* chewed and applied to the wound, and an infusion of which was also drank. I am informed that a rattlesnake will sooner run through a fire than over ash leaves, and that they are never found in the vicinity of ash trees. They were in the habit of using a certain kind of plantain for the cure of the bite of this venomous reptile. Perhaps it was the rattlesnake violet or plantain, *(Viola ovata.)* Certain it is, that this plant is efficacious in the cure of the bite of this serpent. With respect to their method of curing other wounds and diseases I am ignorant.

In peace, the Indians were firm friends; but in war implacable enemies. I am not acquainted with the ceremonies they passed through in declaring war, but after it was engaged in, they were rather inclined to circumvent and ensnare their enemies, than to meet them boldly in the open field.

The Indian mode of life was peculiarly attractive to the English boys. Samuel Allen, the boy who was taken in the meadows, Aug. 25, 1746, at the Barrs fight, was carried to Canada, and he remained with the Indians a year and nine months. He was finally redeemed by Col. John Hawks, of this town, who was a celebrated partizan officer in Indian warfare, and a most useful and worthy man, whose biography should be transmitted to posterity. He was extremely reluctant to see Col. Hawks, who was his uncle, and when he came to his presence he refused to speak the English language, pretending to have forgotten it; and although he was dressed most shabbily, fared most

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miserably, and was covered with vermin, he was extremely loth to leave the Indians. Threats and force were finally employed to make him consent to quit them; and he asserted, to the day of his death, that the Indian mode of life was the happiest. Many of the captives who were carried into Canada would never be redeemed. I have already mentioned that a daughter of the Rev. Mr. Williams would never quit the natives. A Mr. Hoyt, who was also taken at the last destruction of the town, and who remained with the Indians nearly two years, could hardly be persuaded to leave them. His master was very much attached to him, and after he had sold him to our commissioner, he regretted the sale, and was extremely anxious to procure him again. Many years after, his master came down from Canada, and made him a visit, and tarried with him several days, and they appeared to be very happy in each other's company. At his departure, Mr. Hoyt escorted him twenty miles through the woods towards Albany. He afterwards visited him with several of his tribe, who sat in council at his house with Governor Belcher, of this Commonwealth, who made a treaty with them. The Indians treated Mr. Hoyt, at this time, with great respect. Several speeches were made in the council, and the Indians displayed great oratorical powers.

Much cannot be said with regard to the religion of our Indians. It is believed, however, that they acknowledged the supremacy of an overruling Providence; and they had some notions with regard to a state of rewards and punishments after death. Many of the Indians, after the arrival of the English, became, in a degree, civilized, and embraced the Christian religion. They were very superstitious with regard to priests, or ministers of the gospel, believing them to be supernatural beings. In support of this, I shall extract a paragraph from a sermon of the Rev. Mr. Appleton, of Hatfield, who attended the little band of warriors under Capt. Turner, of Boston, who, in 1676, attacked the Indians at the falls, and defeated them, as I have already mentioned. 'In the hurry and confusion of the retreat, I was separated from the army; the night following, I wandered up and down among the dwelling-

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places of the enemy, but none of them discovered me. The next day, I tendered myself to them as a prisoner, for no way of escape appeared, and I had been a long time without food; but notwithstanding I offered myself to them, they accepted not my offer: when I spake, they answered not; and when I moved towards them, they fled. Finding they would not accept of me as a prisoner, I determined to take the course of the river, and, if possible, find the way home; and after several days of hunger, fatigue and danger, I reached Hatfield.'

Interspersed throughout Mr. Williams's narrative are instances of this superstition with regard to him. His master often threatened to kill him, and as often desisted, probably from no other cause than superstitious fear. Several days after they had proceeded on their journey towards Canada, his master came to him, and told him he should kill him with his pistol, inasmuch as he had attempted to kill him with it; but from some cause unknown, he desisted from his purpose. The Indians, on setting out upon their excursion to Deerfield, were instructed by the catholics in Canada, to baptize all the captives whom they slew upon the journey; but it appears from the narrative that not any were baptized; probably for no other cause than the awe which Mr. Williams inspired.

Their method of torturing their prisoners was cruel and inhuman; though those whom they meant to preserve were treated with tenderness and humanity. When a captive was doomed to die by a council, their usual method was to tie him to a stake, and surround him with dry wood, and roast him to death. They would set fire to the combustible, quench it again, and again rekindle it, until they had gratified their savage natures, and the victim was destroyed. Eight of Capt. Turner's men, on their return from the Fall fight, strayed from their companions, and were attacked, and surrendered to the Indians, on condition that their lives might be spared. They would not grant the request, but took and burnt them to death in the following manner: 'They first covered them with dry thatch, set fire to it, and compelled them to run;

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when one covering was burnt off they put on another, and so continued till death delivered them from their hands.'

On the march to Canada, in snow mid-leg deep, when any of the prisoners became disabled, they despatched them quickly, by knocking them on the head with their tomahawks.

One of their sports with their prisoners was to cause them to run the gauntlet. The Indians arranged themselves in two rows, facing each other, with clubs. They pinioned the hands of the captive, and forced him to run through the ranks, while every Indian gave him a severe blow with his club. Captain Clisson, from this town, was severely mangled by them in this way, while in Canada, and under the protection of the French. His lower jaw was broken, and he was otherwise most cruelly bruised. He was afterwards extremely indignant against the Indians for this outrage, and the bare mention of an Indian would rouse a resentment in his breast, as furious as a lion or a bear.

A curious tradition is related of them, showing their superstition. The ground on the top of Long Hill, about three miles south of Deerfield street, on a sudden gave way, and sunk many feet. This was the ground on which they held their *pow-wows*. They uniformly imputed it to their dances and yells, and were extremely terrified, supposing that they had offended their gods. The land is light and sandy, and a brook ran at the foot of the hill. The chasm was produced by the action of the water of the brook. This chasm is now a great curiosity. Thousands of tons of sand have been carried by the water into the adjacent highway and field, and a man can scarcely look into the gulf without horror.

The Indians were very much attached to their friends and relatives. A squaw, at the south part of the town, lost a child about the time the Indians left the town for the last time. She refused to go with them till the flesh was rotted from the bones of her child, that she might carry them with her. After it had been buried about two years, she was observed, by Miss Allen, to dig it up, carry it to a brook, scrape the flesh from the bones, wash them

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in the brook, carefully pack them in a box, suspend it across her shoulders and depart. This fact is corroborated by Capt. Locke, recently deceased. In this notion, this tribe of Indians was not singular. I believe all the tribes in America follow it.

A fact of a similar character is mentioned by Colden, in his history of the Five Nations. He says, 'They are very superstitious in observing omens and dreams. An officer of the regular troops has informed me that when he had the command of the garrison of Oswego, a boy of one of the westward nations died there; the parents made a regular pile of split wood, and laid the corpse upon it, and burnt it. While the pile was burning, they stood gravely looking on without any lamentation; but when it was burnt down, they gathered up the bones with many tears, put them into a box, and carried them away with them.' The following account is from the manuscript of a Mr. James Boyd, of Lancaster, Penn., published in the 1st volume of B. S. Barton's Med. and Phys. Journal: 'When the Choctaws dispose of their dead, they wrap the body in a blanket, and lay it upon a scaffold, which is placed before the door of the deceased. Here it must lie until the flesh is sufficiently rotten to be easily scraped from the bones. By the scaffold there are placed several poles painted red, round which the friends mourn. They stand by these poles and mourn and cry three or four times a day over the dead body. The greater the person has been, the longer the mourning continues. After the flesh is sufficiently rotted they send for the 'Bone Pickers,' who are persons appointed expressly for the purpose. They scrape, with their nails, the flesh very clean from the bones; these are put into a box, which is deposited in a house that is built for keeping the bones of the dead. In every town there is one of these houses.' Note by Dr. Barton:—'This fact cannot but be interesting to the historian of the science of anatomy. Some progress must necessarily have been made in a knowledge of the structure of the human body, particularly of the bony fabric, by a people who had adopted and rigidly pursued for a long series of years, a practice such as Mr Boyd has described. When it is re-

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collected that it was the custom of some of the tribes to carry with them for years the bones of their friends, which they occasionally anointed with the fat of bears or other animals, it seems highly probable that they must have attained to a considerable knowledge of the osteology of the human body. It certainly would be an object of curiosity to inquire into the Indian nomenclature of the parts of the human body.'

Mr. Jefferson, in his Notes on Virginia, mentions some facts with regard to the superstitions of the Indians respecting the bones of their friends.

With regard to their particular ceremonies in the burial of their dead, I am but partially acquainted. A part of the tribe of Mohegan Indians still reside upon the banks of the Thames, in Norwich, Connecticut. To the royal family of that tribe, Uncas, their chief, reserved a spot of ground for a place of burial. It is six miles from their present village. The last member of his family was buried there a few years since. The mode in which they carried the body was to suspend a coffin of rough boards under the axletree of a carriage drawn by a horse. At the grave they buried a pot of succotash for food to the deceased, during her passage to the other world, and some valuable trinkets. This custom is very general among all the Indian tribes. It is presumed that our Indians followed it, for with the bones, are frequently dug up stone pots, kettles, trinkets, &c. In digging a cellar at the Barrs, the workmen, at the depth of two feet from the surface of the ground, discovered the bones of an Indian in a sitting posture, facing the rising sun. Between his legs was found a brass kettle, much corroded, and in it, various trinkets, beads, &c. By his side were found ornaments which were probably worn in his nose and ears. An Indian was ploughed up in one of our fields, with his gun beside him. They had a burial place at Petty's Plain, on the borders of the hill which bounded the lake. This is the most romantic situation imaginable; on a commanding elevation, overlooking the villages of Deerfield and Greenfield, and our extensive meadows. It appears to have been regularly laid out, and all the bodies which

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have been dug up there were buried in the same manner, lying north and south, contrary to the customs of civilized people, upon their right sides, with their heads to the south, and facing the rising sun. Some of the bodies have been enveloped in cloth, and some in birch bark. Near this burying-ground a pine tree was recently standing, with the body of an Indian sculptured upon it. Another large Indian burial-ground is on the banks of Deerfield River, a few rods west of the street, and adjoining the old street burying-ground, which has been used by our people till within a few years. By many, this Indian burying-ground is believed to be the cemetery of our people; but the following facts settle the question with regard to its belonging to the Indians, indisputably. 1. Every body which has been dug up there has been found in the position mentioned above, lying north and south,—the head to the south and facing the east. This was their uniform method of burial, when they were not obliged to bury their dead in a hurry, as after a battle. All the graves of our citizens, on the contrary, in the ground adjoining, are laid out from east to west. The oldest monument which we can find in our burying-ground is dated 1696. 2. Many of the bodies which have been dug up in the Indian burying-ground have been enveloped in white birch bark, in a considerable state of preservation. The white people, it is well known, always bury in wooden coffins. 3. Various trinkets, principally of Indian manufacture, are found with the bones which are dug up in the Indian burying-ground. 4. The manner of burying in this yard was exactly similar to that at Petty's Plain, which all are willing to allow, was an Indian burying-ground.

Judging from the skeletons of our Indians, they were tall and well proportioned. Among all the bones which I have seen, I have never discovered one that was in the least deformed or disproportioned. Their cheek-bones were high, and rather prominent. The forehead, or *os frontis*, was very narrow, and the temporal bones depressed. They were full-breasted.

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The Indians were in the habit of chewing and smoking tobacco, or some other narcotic plant, long before the Europeans arrived among them. Some have asserted that they made use of Indian tobacco, which they called *cycochomy*. Perhaps it may be owing to this circumstance, that they have such remarkably fine teeth. They were hardly ever known to have rotten teeth. I have never seen but one, among all which I have examined. It is said they made use of red willow bark to prevent the tooth-ache.

The following are some of their implements which have been presented to the Museum in Deerfield Academy.

1. A clay pipe and bead, found in digging the canal at South Hadley, five feet below the bed of the river.

2. Indian pipes of stone.

3. Fragments of a pipe of Indian composition in this town.

4. A pipe found at Smead's Island, in Connecticut River, Montague. In this Museum are many pipes of steatite or soapstone, curiously wrought to resemble the head and bill of a bird, of a fox, the human head, face, &c. These pipes generally have wooden stems.

5. Indian tools, spikes for their arrows, and fragments of vessels of stone, &c., of Indian manufacture and composition, before the introduction of iron among them. There are various specimens of spears for their arrows. Some of them are Quartz, and the rest generally black and red jasper and flint. Jasper is sometimes found in large bowlder specimens in the beach of our river, and is brought down by the water from our western, and perhaps Hoosick mountains. There is none of this kind of flint found native here; though hornstone, somewhat resembling it, has been found in Conway. These spears are found in great abundance in various parts of the town.

6. An Indian axe, and fragment of another, found at Greenfield. The manner in which they affixed handles to their axes, or hatchets, was to split a thrifty young sapling tree, place the hatchet in it, and let it remain there a year or two, until the tree had grown round it sufficiently tight, when they cut it down and shaped it into a handle.

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7. An Indian mortar and pestle.
8. An Indian Squaw's pocket of rattlesnake skin.
9. A pair of Indian moccasins, or shoes, from Deerfield.
10. An Indian knife from Deerfield.
11. A line taken from an Indian who was killed at the Barrs fight, in this town, Aug. 25, 1746. It is called by the Indians the 'captive line.' The inside of the belt was filled with the sharp points of hedgehog quills; and when a prisoner was led in triumph, it was put round his neck, with one Indian forward and another behind, each holding the line.
12. An Indian bullet-pouch.
13. An Indian sash.
14. An Indian petunk.
15. An Indian gorget.
16. A pair of Indian or Canadian wooden shoes.
17. A shirt which Mr. Samuel Allen wore at the Barrs fight, at the time he was killed by the Indians, in 1746.
18. An Indian pipe found in this town.
19. An Indian birch-bark canoe.
20. A spoon found about two feet beneath the surface, in Deerfield.
21. An Indian pipe.
22. An Indian war-club.
23. Indian pots, found at Rocky Mountain, in Deerfield.
24. An Indian pipe of stone.
25. Indian implements, use unknown, from Deerfield.
26. Fragments of Indian Utensils found in Deerfield.
27. A sculptured stone found in the bank of the river, near the burying-place in Deerfield, and near a skeleton.
28. Indian fish-hooks of bone.
29. Indian arrows.
30. Leaden bullets, chewed to make them rough, to cause the wound to be more severe and painful. The Indians supposed that chewing bullets rendered them poisonous. Thousands of these bullets have been found in various parts of the town upon the surface of the ground. They were found in great abundance in the meadow back of the fort, where a severe battle was fought, at the time of

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the last destruction of the town. They are oxydated by exposure to the weather.

Besides the above, which were implements of the Indians who resided in this place, there are various other Indian curiosities, which I have not mentioned, in this Museum. It formerly contained a good collection of specimens in natural history.

I shall conclude these sketches with the following translation of the speech of an Indian, not because I subscribe to the sentiments, but to show his unbending firmness and independence of mind, and his great oratorical powers.

'Red man of the woods, hear what the Great Spirit says to his children who have deserted him. Through the wide regions which were once the inheritance of my people, and where for ages they roved free as the wild winds, resounds the axe of the white man. The paths of your forefathers are polluted by their steps, and your hunting fields are every day wrested from you by their arts. Once on the shores of the mighty ocean your fathers were wont to enjoy all the luxuriant delights of the deep. Now you are exiled in swamps, or on barren hills; and these wretched possessions you enjoy by the precarious tenure of the white man's will. The shrill cry of revelry or war is no more heard on the mighty shores of the Connecticut, or the sweet banks of the silver Deerfield. There, where the Indian lived and died, free as the air he breathed, and chased the panther and the deer from morn till evening; even there the christian slave cultivates the soil in undisturbed possession, and as he whistles behind his plough, turns up the sacred remains of your buried ancestors. Have you not heard at evening, and sometimes in the dead of night, those mournful and melodious sounds that steal through the deep vallies, or along the mountain-sides like the song of echo? These are the wailings of those spirits whose bones have been turned up by the sacrilegious labors of the white man, and left to the mercy of the rain and the tempest. They call upon you to avenge them; they adjure you by every motive that can rouse the heart of the brave, to wake from your long sleep, and by returning to these invaders of the grave the long arrears

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of vengeance, restore again the tired and wandering spirits to their blissful paradise far beyond the blue hills.

'These are the blessings you owe the white man; they have driven your fathers from their ancient inheritance; they have destroyed them by the sword and poisonous liquors, and they have dug up their bones, and there left them to bleach in the wind.

'Hear me, O deluded people, for the last time! If you persist in deserting my altars, if you are determined to listen with fatal credulity to the strange pernicious doctrines of these christian usurpers, if you are unalterably devoted to your new gods and new customs, if you *will* be the friend of the white man, and the follower of his God, my wrath shall follow you. I will dart my arrows of forked lightning among your towns, and send the warring tempests of winter to devour you. Ye shall become bloated with intemperance, your number shall dwindle away until but a few wretched slaves survive, and these shall be driven deeper and deeper into the wild, there to associate with the dastard beasts of the forest, who once fled before the mighty hunters of your tribe. The spirits of your fathers shall curse you from the shores of that happy island in the great lake, where they enjoy an everlasting season of hunting, and chase the wild deer with dogs swifter than the wind. Lastly, I swear by the lightning, the thunder and the tempest, that in the space of sixty moons, not one of yourselves or of your recreant race shall remain on the face of the earth.'

Deerfield, Mass. Feb. 14th, 1834.

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[Furnished for the Tracts and Lyceum.]

POPULAR BOTANY.—No. II.

GENUS;—SPECIES;—VARIETY.

NOTHING is more important in science than good definitions and a clear understanding of terms. Much of the confusion in this science has arisen from the vague ideas attached to the above terms.

A genus consists of a number of species or kinds of plants, which agree in certain particulars with regard to the flower and fruit. *Rose* is the name of a genus of plants with which every one is familiar; and its peculiar fruit, often remaining on the bushes all winter, and which will serve to distinguish a rose from any other plant, is as well known as its beautiful and fragrant flower. It may be remembered that the rose, in a state of nature, has but five petals or flower-leaves, as may be seen in our common wild roses; and that in this and many other plants, whose petals have been so greatly multiplied by cultivation, this superabundance is produced by a change of the yellow filaments, within the flower, into petals. Of course, in a full or double flower, they are hardly to be found at all. It is, however, a fact worthy of remark, that these highly prized and highly cherished productions of the gardener's skill, are incapable of producing *any perfect seed*, and are useless members of the community of flowers.

A species is one distinct kind; and every product of the seed of any plant is considered as the same species. Any alteration produced by culture, change of climate or of soil, is called a variety. But these variations are not permanent, nor capable of being continued in the seed. The seed of an apple, when sown, will always produce an apple-tree, but not always the same kind of apples, so that the cultivator is obliged to engraft the young tree with a scion of the kind he desires. This is not a natural re-production, as by seed, but a continuation of the same plant, deriving its nourishment from a new source, artificially applied, but to which change, nature, in time, accommodates herself, and finishes the work begun by art.

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Many of the superb kinds of roses exhibited by our florists, the splendidly colored tulips, and the rich and showy dahlias, are varieties, induced by cultivation, of single species.

A name, which has so great influence with the world in judging their fellow men, has hardly less upon their ideas of a plant. Hence all to which the same general name is given, are, without hesitation, concluded to belong to the same genus. The name lily is applied to several distinct genera* besides the true lily, of which the white garden lily and the wild red lily may be taken as examples, and which may be known by its *six separate* petals and *erect* stamens. The Hemerocallis, called day lily and garden lily, with flag-like leaves and yellow flowers, has its six petals united at the bottom into a tube, and the stamens all bent one way. The water lilies none will mistake, or confound with the land lilies. Their spreading rose-like flowers, with numerous rows of petals, and the great number of golden stamens in the centre, sufficiently distinguish the white water lily, the only species we have of this elegant genus. The humble and modest flower called lily of the valley, belongs to another genus, which may be known by its bearing a berry instead of a dry capsule or shell, as the true lilies do. Of this genus, called by botanists Convallaria, we have several wild species, far exceeding in size, and equalling in beauty, this delicate garden flower. Among these is one which has received the popular name of 'Solomon's Seal.'

METAMORPHOSIS OF SPECIES.

The idea of many kinds springing from one stock, as in the production of varieties of a single species, has been carried to a ridiculous excess. I have heard it gravely asserted that the whole race of cucumbers, melons, pumpkins and squashes, sprang from the wild gourd. With an equal degree of confidence has it been stated that the potato, if planted at the south, would produce the sweet potato; and that the sweet potato, brought here, would pro-

* The plural of GENUS, which, as it is a Latin word, used because there is no English for it, has the Latin plural.

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duce our potato. When acorns produce chesnuts, we may expect these things will come to pass. But perhaps it is not generally known that these potatoes belong to different genera, and to distinct families of plants; and that the sweet potato is the root of a vine, a species of the convolvulus, or morning-glory.

The changes produced on plants by long continued culture are indeed wonderful. The amelioration of fruits by cultivation is a most wise provision of the Creator, who has so ordered it, as an incentive of obedience to the mandate, 'In the sweat of thy brow shalt thou eat thy bread.'

CLASSIFICATION.

For the sake of method, botanists have arranged plants in classes, each class comprehending several genera. Linnæus divided the vegetable kingdom into twenty-four classes, by the stamens. By this means a botanist can readily find the name of a plant of which he is ignorant, provided it be described in his books. He has only to count the stamens to know the class; he finds that class in his book, and among the descriptions he finds one which exactly agrees with the plant he has in his hand. To the description he finds attached the name of the plant.

I shall not enter into details of the method of classification at present, but it may be resumed in some future paper. B. B.

[Furnished for the Tracts and Lyceum.]

MUSIC.

Music is an innocent luxury, not essentially necessary to our existence, but an improvement and gratification to the sense of hearing. It has generally been behind the other arts in this country. Among those avocations which require mental exertion and capacity, the profession of music may be considered not the least; and its pleasing effects make it peculiarly the object of respect and atten-

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tion. It is, therefore, very natural to pay deference to intellectual eminence, and to regard those talents which are acquired by ardent application, as well as to admire the influence of those powers with which nature has endowed the human mind.

A professor of music has open to his view a field which leads to eminence and honor; and is bounded only by the finite nature of the mind. Genius can wanton without restraint, and labor forever, and find new sources to explore; every faculty may be employed, every sense occupied, and the whole soul called forth to display its most secluded operations. The predominance of merit constitutes professional, as it does individual character, in each of these avocations. Professors will be found of great and original talents, and of strenuous and aspiring minds, wonderful alike for the vigor of their intellectual strength, and acuteness of principle of action; and though severe, it is but truth to remark, that in each, characters will be found, who add nothing to their profession but disgrace and dishonor.

Among many of the literati in musical knowledge, taste and fashion possess an irresistible sway; and it is often that our enjoyment does not proceed from the music itself, but from the self-gratification of being able to play what is new or in vogue, without the possibility of deriving pleasure from the beauties of what is placed before them. It cannot be supposed that musical talent is more rare in this metropolis than in many other places, but it is apprehended that musical education is by no means what it ought to be.

Teachers, in general, are required only to instruct their pupils in the art of reading and moving the fingers; but we very seldom find that the pupils are taught *to understand music.* How often do we listen to brilliant and accurate execution on the piano forte, but are mortified to find that the player moves the fingers with mere mechanical dexterity, following implicitly what is set down, without seeming to *feel* the beauties, or to be aware of the defects in the piece. The taste of a composer leads him to mark the most expressive and feeling passages, where his judg-

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ment dictates; but it is no unfrequent occurrence to find a musician disposed to display his own feelings in opposition to those of the author. It is very dangerous to attempt this, unless done by a sound, thorough-bred musician. The rules of harmony are scarcely ever well understood, even by those whose performances are greatly admired. There are very few persons who can take up a piece of music written in score, and study its harmony; not that they are incapable, but that they have not been taught what should have been the very foundation of a musical education.

A taste for refined music, and a sense of the beauty of complicated works of art, has arisen from the influence of sacred music, and the cultivation of the mind which the continual influence of such performances consequently has produced. The Italians, from the first restoration of the art in their country, have been habituated to the finest and most impressive music, to increase the pomp and enhance the fervor of public worship; and in the well-known and proverbial taste of that people for every species of music, as well as in the unrivalled beauty and celebrity of their composers, we perceive the natural effects of such advantages. Thousands who could never be brought to attend to music as a matter of amusement only, or would despise it as the subject of serious thoughts, are insensibly led to feel its charms when it mingles with their weekly devotions. Greater and more lasting effects may be anticipated on the national taste, from the influence of sacred music, than from the greatest exertions of skill in that which is devoted to mere amusement; and in particular, it is from the habit of hearing the great works of genius in that sublime branch of the art, that a taste for its higher beauties, and an appreciation of its complicated excellencies, is to be acquired.

P*****.

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FIRST FOOD OF YOUNG FISHES.

THAT law by which fishes are supplied with their first food, after escaping from the egg, is no less interesting than remarkable. The parent manifests no maternal solicitude for the coming progeny, which, when ushered into being, are without a guide, without experience, without sagacity, without protection, without instinctive propensities, without a perfectly developed mouth, without adhesive society, and without anything but *food*. Ample provision is invariably in store for the young fish, of the best quality and most nutritious character; nor does the supply ever fail, till the tiny animal has strength enough to pursue, and sagacity to discriminate, its appropriate food.

In the egg there is a yolk, which does not enter into the composition of the animal's body, but constitutes a mass of food, destined for the future maintenance of the fish, till it is physically enabled to provide for its own wants. This is the fact in relation to all eggs; the yolk being designed for the exclusive support of the bird, crocodile, serpent, &c., as the case may be. With these latter classes, however, this central portion of the egg is carefully encased in the body, at the time of its birth from the shell. Being located near the stomach, a tube leads into that organ, or the first portion of the intestinal apparatus, through which the yolk flows, from time to time, to be digested, according to the necessities of the young animal. Chickens, goslings, young turkies and ducks, about which farmers feel so much solicitude, have a perfectly whole yolk in their bodies at the time of being hatched; and the reason so many die prematurely is, because they are forced to eat too soon. Let young poultry alone, and when the stock is exhausted which was brought into the world with them, then they give manifestations of a disposition to feed.

Fishes, on the contrary, carry the yolk by a suspensary bag, at the underside of their bodies. As the matter passes upward into the stomach, through the pipe by which

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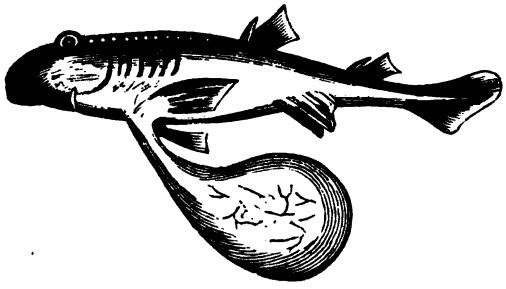
the sac is connected to the body, the bulk becomes smaller and smaller from day to day, till it entirely disappears.



The annexed drawing shows precisely the appearance of a young blue shark, when short of a week old, as it freely swims about with a store-house of food. In the cartilaginous fishes, the sac is very much larger, in proportion to the size of the individual to which it is appended, than in the variety called *osseous* fishes. Probably a longer period is requisite for the young shark to prepare to hunt for itself, than the more peaceably disposed tribes, which have bony skeletons.

NATIVE DYES.

The early Dutch settlers of New-York turned their attention to improving the dyes of the country. Great hopes were entertained from the wild indigo; and they not only supposed that the common indigo might be raised to great advantage, but they actually tried the experiment. Seed was imported from Holland. The first attempt failed, owing, as it was supposed, to an extraordinary drought, which prevented the plant from coming to maturity; but another experiment completely succeeded. The seed was sown near New Amsterdam, (New-York) and a great crop

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was obtained; specimens were sent to the mother country, where good judges pronounced it of a superior quality. But what is more extraordinary is, that there is reason to believe that it was contemplated to introduce the famous orchilla weed. When the Spaniards discovered the Canary Islands they sought for it as eagerly as they did for gold. It was probable that it was made use of to produce the gertulian purple of the ancients; and they also had in their view other vegetable dyes, which we cannot now accurately designate. 'The *crap plant*,' says Van der Donk, 'for dying red, is not cultivated in New Netherland, but it is not to be questioned, that if it were tried it would yield well.

ENTOMOLOGY.

Dr. Smith, the celebrated President of the Linnæan Society, observes, that botany necessarily leads to the study of insects; for it is impossible to investigate plants, in their native situations, without having our attention perpetually awakened by the infinite variety of those little active beings, employed in a thousand different ways, in supplying themselves with food and lodging, in repulsing the attacks of their enemies, or in exercising a more than Asiatic despotism over myriads below them: and he exultingly exclaims, that in England, no branch of natural history, after botany, has, for some years, had more attention paid to it than entomology; while with us, to adopt the language of Dr. Barton, 'Notwithstanding the importance of the science of entomology, the history of our insects has hitherto excited but little attention.'

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ORIGINAL MISCELLANY.

Scientific Doings.—Prof. Farrar's last lecture on astronomy, Thursday evening, at the Temple, and Mr. Fowle's, at the same place, the week before, upon the phrenological characteristics of the skull of the celebrated Whitfield, may be considered as the last of the series which have been given in the city, the present season.—Beside the foregoing, there have been no interesting scientific doings.

Population of the World.—From the Christian Philosopher, we take the following curious statistical calculation. If we suppose that, before the close of time, as many human beings will be brought into existence as have already existed, during by-past ages of the world, there will, of course, be found at the general resurrection, 290,000,000,000 of mankind. Vast as such an assemblage would be, the whole of the human beings here supposed, allowing six square feet for every individual, could be assembled within the space of 62,400 square miles, or on a tract of land not much larger than that of England, which contains, according to the most accurate calculations, above 50,000 square miles.

According to the inquiry of Dr. Hales, 7235 years are to be reckoned from the Creation to the present time; and, consequently, two hundred and twenty thousand millions of human beings will have existed since the Creation, which is more than 226 times the number of inhabitants at present existing.

Tyrian Purple.—When the shell of the purple fish is carefully broken open, there appears a white vein lying transversely in a cleft, next to the head. In this tube is the fluid which gives the celebrated purple dye, so costly at one period in the history of the world, that Roman emperors monopolized all the articles of dress which were stained with it. Some recent experiments on this subject are quite interesting. When the vessel is punctured the liquor is of a *light green*, but soon changes to a dark green by exposure to the sun, and in a few minutes more, to a sea-green; then *blue*. Scarcely an hour elapses when it assumes a purplish red, and in one hour more, it takes the beautiful purple which is

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never afterwards changed. Even under glass three inches thick, all these varieties of hue progressed as if nothing intervened between the cloth and the rays of light.

Rings of Saturn.—One of the rings of Saturn is 204,000, and the other 184,000 miles in diameter, and both move round that planet every ten hours, diffusing a light which must be equal to that of several thousand moons of the size of the earth's. Beside this source of light, Saturn has seven magnificent moons, of different magnitudes, all larger than ours, placed at different distances in celestial space, revolving about that beautiful world at different periods of time. Having within a few evenings had the happiness to witness the appearance of that splendid world and all its accompanying pageantry of attendant globes, through a telescope of only moderate powers, we involuntarily exclaimed, in the language of a well known writer, 'This is a visible and permanent emblem of the Majesty and Glory of their Creator!'

Idea of Distance.—It has been computed, ayss Mr. Dick, that the earth, supposing it a solid globe, contains about 30,000,000,000,000,000,000,000,000,000,000, or 30 septillions of grains of sand, supposing a hundred grains of sand to be equal in length to an inch, and, consequently, a million of such grains for every cubical inch. If we use this number as a standard for estimating the number of cubical miles contained within the space which intervenes between us and the nearest stars, we shall find that the number of cubical miles comprehended within this space, is more than ten thousand millions of times greater than the number of the grains of sand contained in the globe on which we dwell.

Plants.—The immense collection of Natural History, which may be seen at the Museum of Paris, shows that botanists are already acquainted with about fifty-six thousand different species of plants; and it is probable that these form but a very small proportion of what actually exist. Probably the industry of future ages will discover several hundred thousand species more. Some naturalists have supposed that there is not a square league of the earth's surface, that does not present some one vegetable production peculiar to itself.

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A City in the Moon.—Schroeter conjectures the existence of a great city in the moon, to the north of *Marius*, (a spot marked by astronomers,) and an extensive canal towards *Hygena*, (another spot.) He believes a place, named by the learned, on the face of the moon, *Mare Imbrium*, to be as fertile as Campania. Professor Frauenhofer, of Munich, a few years since, announced the discovery of a *fortification* in this satellite! However, such is the perfection of telescopes, at this time, that an edifice as large as the capitol at Washington, might be clearly and distinctly seen. A vast celestial field yet remains to be explored; for astronomy is really only in its infancy.

Brilliant Scintillating Fire, for Fireworks.—In China, the art of Pyrotechny is far better understood than in Europe. Instead, for example, of throwing in iron filings to give brilliancy to fireworks, they pulverize old cast-iron pots, till the grains are about the size of radish seed. They then sift the mass, and so, by sieves of different degrees of fineness, get several sized grains, which are used according to the nature of the exhibition. With these grains, however, mixed in the common rocket composition, the sparks are so exceedingly brilliant that the eye can scarcely endure the sight. Can any correspondent explain this fact, why old pot metal should possess this quality?

A Whispering Tunnel.—Don Gauter proposed to build horizontal tunnels, widening at the remote extremity, through which, by actual experiment, he found that the ticking of a watch might be heard distinctly at the distance of four hundred fathoms, equal to half a mile. He calculated that a series of such tubes would convey sounds or articulate language, nine hundred miles an hour. His object was to supersede telegraphic communications. In the great wall of China, it is said that pipes were laid, and through them the sentinels hold conversation, from one post to another.

Hitchcock's Geological Report.—A second edition of Prof. Hitchcock's valuable Report on the Geology, Mineralogy, Botany and Zoology of Massachusetts is in progress, by order of the State. Corrections and additions will unquestionably be made, that will render it one of the most valuable scientific works this country has produced.

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MAMMOTH LENS.—A Mr. Parker, of London, a few years ago, constructed a lens three feet in diameter, which had a focus of six feet eight inches, weighing 212 pounds. By it, twenty grains of gold were melted in four seconds; ten grains of platina were fused in three seconds. This magnificent instrument was purchased by the British Government, we believe, to be sent as a present to the Emperor of China; and at this moment, without doubt, it lies among the rubbish of the celestial palace of Pekin, a memorial of English barbarian ingenuity.

ANIMATED BEINGS.—Probably, there are 500 species of quadrupeds on the globe, and every species contains, perhaps, many millions of individuals;—certainly it is so of some. For example, of birds, it is thought there are 4000 species; of fishes, 2500; of reptiles, 700; and 44,000 different kinds of insects, beside many thousands of species altogether invisible to the eye. Who can say, and be rational, this vast variety of animated beings were the result of chance.

FOSSIL SHELLS.—At Touraine, in France, a hundred miles from the sea, is a bed of shells stretching nine leagues in extent, and twenty feet in depth, in which are included species not known to exist in the neighboring ocean. Humboldt found sea-shells on the Andes, at an elevation of 14,120 feet above the level of the sea. All the islands in Boston harbor rest on beds of marine weeds and the common shells found at their bases. These are all positive evidences of a general deluge.

MUSKET BALL IN A MAN'S BRAIN.—Dr. Heunen has recorded the following case of a French soldier, wounded at Waterloo. The ball entered the right eye; the left, though not in the slightest degree injured, to appearance, was nevertheless completely blind. Dr. Heunen felt carefully in the neighborhood of the wound, but could never find the ball. The patient was confident that it was in his brain, and under these circumstances he returned to France.

SOUND.—In the war between England and Holland, in 1672, the noise of the guns was heard in those parts of Wales which were estimated to be two hundred miles distant from the place where they were fired.

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Poisonous Fish.—Eels, salmon, herrings and clams are the only fish, in this country, that are poisonous; and happily, it is only when individuals of these families have been feeding on something particularly injurious to themselves, that they are thought to be injurious to man. Sudden heat, distension of the stomach, fever, severe headache, nausea, vomition, with a rash, and a burning and intolerable itching of the skin, are the certain effects from this cause.

A Monument to Philosophers.—In the city of Quang-Ping, which is of the first rank in the northern part of the province of Pe-tcheli, 212 miles south-south-west from Pekin, is a temple dedicated to the memory of those renowned philosophers who have discovered the secret of rendering themselves immortal!

Wolverene, *Gulo arcticus*, inhabiting northern Europe and America, is distinguished for its voracity. Usually, its size does not differ materially from that of the Badger. When a sufficient supply of birds and small animals cannot be procured, it is said to conceal itself on the horizontal branch of a tree, from which it drops on deer and other large quadrupeds which are passing beneath, and sticks so closely, that it cannot be shaken off. By extracting blood in considerable quantity, their prey becomes weakened, and finally is overcome by exhaustion. According to Dr. Richardson, the wolverene is extremely annoying to hunters, by devouring their stores of provision, and carrying off their martin traps. It has been known to visit daily a line of traps extending upwards of two miles, and to rob the whole of them of their baits, and of such animals as had been caught.

Green Monkey. *Simia sabœa.*—In captivity it displays considerable malice as well as intelligence. Adamson found them in immense numbers in Senegal. Though in large troops, upon trees, he did not at first notice them, until his attention was aroused by their flinging branches of trees towards him. They were not at all frightened by the discharge of fire-arms, and preserved the most profound silence, even when they were wounded. The one which has been figured by M. F. Cuvier, was remarkably gentle. He was fond of being handled by those whom he knew, and expressed his satisfaction by a gentle grunt.

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CHIMPANSE, *Simia troglodytes*, about which so many fables have been related, certainly very nearly resembles man in physical organization. They reside in troops, and can walk with a cane, or use it in self-defence, with adroitness. It is considerably intelligent, and by some naturalists, is said to be susceptible of a kind of education. If, says a modern writer, there be any truth in the statements of travellers, regarding the great wild man of the forests of Africa, there is little reason to doubt that this formidable animal will turn out to be the adult chimpanse, as all the specimens brought to Europe displayed their nonage by their teeth, and other indications.

TENCH. *Tinca vulgaris*.—This fish, like the carp, has a thick, short body, of a brownish yellow color, and measures from twelve to fourteen inches in length. It is also very tenacious of life. In clearring out an old pond in Yorkshire, England, in 1801, where rubbish had been thrown for years, and where no fish were supposed to reside, two hundred tench and as many perch were found; and in a hole, among some roots, was also discovered a large fish, 2 feet 9 inches long, and 2 feet 3 inches in circumference, which appeared to have been stationary for years, and which, in the process of growth, had accommodated its body to the form of the hole.

PUFF-BALL. *Lycoperdon*.—Every particle of the extremely fine dust of the puff-ball, seen in the fields, is of a globular form, of an orange color, and also has a minute stalk on one side. After the smoke subsides, on breaking a puff-ball, the stalk of the globule settles in the ground, for that appendage is invariably the under side when at rest. So very small are the globules, that by actual examination under a microscope, it has been ascertained that a cube the diameter of a hair, would be equal to *one hundred and twenty-five thousand of them*. Persons have been made blind considerable time, by this mushroom smoke. Inflammation and darting pains, which result from an incautious exposure, are supposed to be caused by the sharpness of the stalks.

COLD.—The greatest natural cold ascertained by thermometrical measurement, was experienced by the elder Gmelin, in 1735, at Ianiseik: the mercury froze in the instrument, and the sparrows and jays were all killed.

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PHILIPPINE WEAVER, *Plocus Philippinus*, a native of the Philippine Islands, is a very curious bird. The plumage is brown above, and yellowish beneath—the throat, brown, and the crown of the head and breast, yellow. It forms a nest in a remarkable manner,—like a long cylinder, swelling out in the middle, of fine fibres of leaves and grass, which is fastened at one end to the topmost branch of a high tree. Within are two compartments, the eggs being deposited in the globose region; and the entrance is at the bottom. Generally, the nest is suspended over water. The weaver may be rendered so very tame as to come and perch on its master's hand, or fetch and carry small parcels, like a dog.

JAVANESE BAT, *Pteropus Javanicus*, is the largest bat in the world,—the body being a foot long, and the spread of the wings five feet in extent. In the lower parts of Java they are numerous, and live socially. Individuals select a large tree for a resort, and suspending themselves by the claw of the posterior extremity, to the branches, present a singular spectacle. They pass the greater part of the day in sleep. Soon after sunset they gradually quit their hold and proceed to the forests, villages and plantations, devouring indiscriminately every kind of fruit not protected against their depredations.

THE CIVET, *Viverra civetta*, which furnishes the odoriferous substance called *civet*, in the East, is an animal of considerable commercial importance. Civet is secreted in a bag in the posterior part of the body, which opens externally by a narrow cleft; and each sac—for there is one on either side—is about the size of an almond. Inside, the lining membrane is slightly covered with hair. When nearly full, the animal has the power of compressing them, so as to extrude the superfluous portion of the secretion.

PECULIAR GROWTH OF HUMAN HAIR.—White mentions an Italian lady whose hair trailed on the ground when she stood upright. The same may be said of the fashionable Greek females of the present day. A Prussian soldier had it long enough to reach the ground. Mention is made by Lawrence of an English lady, whose hair was six feet long. Mr. Hearne saw an American Indian, six feet tall, whose hair, which, by the way, was only a single lock, touched the ground.

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SYMPATHY.—On the authority of Pallas, a well-known writer, it is stated, that when the camel refuses to nurse her young, which is not a very common circumstance, the Mongols and the Daurian Tungooses have recourse to an expedient which is always successful. They make a plaintive noise in imitation of the calf, which elicits copious tears from the mother, whose maternal feelings are so excited, that she cannot any longer deny her helpless offspring.

FASHIONABLE EARS.—The Brazilian Indians, after slitting their ears, insert gourds, beginning with the neck, and keep crowding in further and further, from time to time, till the lower portion actually touches the shoulders. By this contrivance, ornaments show to advantage; but when they go into battle, they are tied together behind the head to be out of the way.

TO CORRESPONDENTS.

An Essay on ACOUSTICS, with its numerous diagrams, has been received, and will be the leading article a few weeks hence.

A valuable paper, accompanied with illustrations, on moulding with plaster, or the art of taking masks from living faces, &c., which must be highly useful to those who cultivate natural history, as well as artists, will also appear as soon as room can be afforded.

J. S. J. has shown more revenge than is warrantable: a little larger development of the organ of benevolence would certainly contribute to his own personal happiness; and it is therefore recommended to him to cultivate its growth. We shall never consent to have any man abused, in this Journal, for what he has written; particularly, when, as in the present case, it is so clearly shown that ENVY, and nothing else, prompted the author to manufacture this scurvilous article. Deliver us from the polluting touch of that devil in the form of a human being, who, while he daily offers you his hand, in the concealed recesses of his hypocritical heart, would heartily rejoice to see you consigned to the tomb.

The communication from Craftsbury, Vt., on Rational Analysis, will be in the next number.

Mr. PAGE's paper is safe.

Mr. FOWLER will find a similar operation, with nearly the same results, in Saunder's Treatise on the Eye, page 200, London edition of 1816.

PLINY,—all well.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

MAY 1, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

MOULDING AND CASTING IN PLASTER.

An attempt has been made to give, in a few words, a practical account of the manner in which casts are made, and of the moulds in which figures are cast. If the attempt has been successful, the writer will not deem the short time spent in preparing it, wasted.

As every one can see the important uses to which this art can be applied, there will be no necessity of enumerating them here. Some few, however, will be mentioned, as the different modes in which moulds must be made and casts taken, are described.

Before proceeding to the subject, it will be well to mention the articles and apparatus used. For casting and making moulds, the following materials are used, viz., plaster of paris, or native sulphate of lime, sulphur, wax, fish-isinglass, tin-foil, and tin. The plaster is prepared by grinding the gypsum very fine, and afterwards by boiling or baking it, as required for coarse or fine casting. By this means the water of crystalization is expelled. When used, water is added to this impalpable powder, which supplies the place of that expelled, and causes it to assume again the solid form. When an extra article is required, the plaster is again passed between the stones of the mill, and sifted. The nicest will resemble the finest wheat flour. The moisture of the atmosphere will injure it, if it is exposed to its influence; therefore we must guard against

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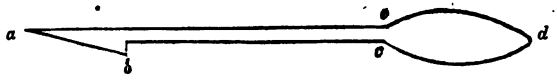
it, and every description of dampness. Plaster already prepared can be obtained at a trifling expense, in every large city. In this, there are many mills exclusively devoted to the purpose of preparing plaster for casting and stucco-work. For medallions and ornamental figures, the plaster cannot be too fine and white; for moulds, a coarser sort will answer. Figure-casters prefer for use that which does not harden soonest: the reason is plain, for they are enabled to cast more figures at one mixing. For some purposes it cannot harden too quick.

Although plaster is used for casting figures and making moulds generally, nevertheless, for some purposes, the other articles mentioned are much better. Sulphur is much used for taking moulds from coins, medallions and bass-reliefs, on account of the exact and minute impression which it is capable of receiving. Tin-foil and tin are used when sulphur would injure the medals to be copied. Wax is much used for imitating fruit and flowers, and for some parts of plaster moulds where it would be difficult to use the gypsum. Isinglass and common glue likewise are used. These articles can be obtained at any of the drug-gists' shops.

Fig. I.



The utensils necessary for casting are always at hand; viz., bowls, spoons, knives, &c. For trimming casts, it would be well to have an instrument (see Fig I,) about eight inches long, the edges of which, from *a* to *b*, and from *c* to *d* around to *c*, are sharp; from *b* to *c* the instrument should be round, so as to fit the hand of the operator. This can be made by any smith, from a piece of steel, or from brass, which is much better, on account of its not rusting. The bowl used, should have a spout or nose, like that of a pitcher, in order to direct the material, when required, in a small stream. The other necessary things will suggest themselves.

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One of the most important parts, and perhaps the most difficult, is to mix the plaster and water properly. The manner is as follows:—As much water as is necessary to be used is put into the bowl; the plaster is then shaken into it from the hand or a spoon, *without stirring*, till no more can be moistened by the water. In this situation it is suffered to remain about one minute, until the plaster is free from air; this can be known by the mixture ceasing to bubble; by this, small holes are prevented from occurring in the casts, which is very desirable. The contents of the bowl are then stirred together and used. In casting hollow figures, the mixture should have the consistency of cream; for making moulds it should be thicker. The plaster must be used as soon as it is well mixed; if too thick, it can be diluted, but this must be done when it is first stirred.

The mode of making moulds is different, according to the objects to be copied. For instance, anything soft and pliable, like parts of the human body, can be easily taken at once, as the object can be delivered from the cast without injury to either; whereas, from a hard body, as a marble bust, many pieces are required. Each manner will be described separately.

In making a mould from a *soft and yielding* substance, it is necessary first to lubricate the object well with a mixture of oil and tallow. The oil is used to prevent the plaster, when hardened, from adhering too tightly to the object to be copied; and, without the slight adhesive power of the tallow, the liquid plaster would be apt to run off as fast as put on. After having put the oil and tallow on delicately and thoroughly, with a brush, the plaster must be mixed with the water, and be put on. At first, a thin coat only had better be put on, so as to prevent distortion, which would ensue, were much of the heavy material to be heaped on. After the plaster has become somewhat firm, enough should be put on to make the mould have a tolerable degree of strength. When hard, the object must be carefully removed, after which it is ready to be seasoned, which process will be described in its proper place.

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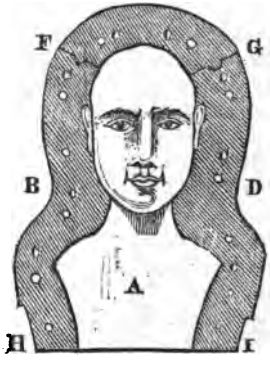
Moulds from *flat surfaces* of *hard bodies* are made in precisely the same way.

Moulds from *medallions* are best made of sulphur. The mode is this :—First, the medal, if it is of plaster, must be seasoned; then a rim of sheet-tin, of about half an inch in width, should be placed around it, and be kept in place by a cord. The medal must next be delicately oiled with a little olive oil. Thus prepared, it should be held to the fire till it is quite warm, after which, the melted sulphur is to be poured upon it, and allowed to get nearly cold. Just before it is cold, a little freshly-mixed plaster had better be cast on top of the sulphur, which causes it to separate itself from the medal, and, besides, gives strength to the mould. Moulds thus made require no seasoning, and give beautiful impressions.

Fig. II.



Moulds from *hard and irregular* bodies, as from figures, busts, &c., consist of many pieces, and are more difficult to make than those above described. They are made by pieces, in the following manner :—First, one piece must be made as above, care being taken that the mould will separate from the object without damage to either. This

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piece, having been made, must be trimmed smoothly at the edges, and a few holes, or, as they are technically called, *keys*, should be made in the edges, so that the next piece may make a good joint with it, and the pieces of the mould be more easily kept together. The piece thus made must be placed on the object exactly in its first position, and its edges must be well greased, to prevent its adhering to the piece to be cast next. Another piece is now to be cast, and served in the same way, until the mould is completed. One example will give a much better idea of the process. Let A (Fig. II,) be a bust, from which a mould is to be taken. In the first place, the bust (A) must be well brushed over with oil; the plaster (B) is then put on by a spatula or spoon, and, as it grows hard, is heaped on, until the piece is sufficiently thick to be strong. This piece, (B) as can be seen from the figure, covers a part of the bust extending from F to H. After having become hard, this piece is removed from the bust and trimmed, as stated above. Another piece (D) is made on the opposite side of the bust, extending from G to I. When hard, this piece is also removed and trimmed smooth. Small round depressions (C) are made with the instrument described above, and shown in Fig I, in all the sides trimmed, (except the bottom in this case) to serve the purpose of keys. These two pieces, thus made, are to have the edges which have been trimmed well greased; they are then put upon the bust in their former places, and are to be secured firmly by a cord. A third piece (E) must then be cast, and trimmed as the pieces B and D, care being taken not to move the pieces B and D, as they are to form a water-tight joint with the piece E, when hardened. This third piece will have small round protuberances on the extremities which come in contact with the other pieces. These eminences correspond to the depressions in the pieces B and D, and keep them all firmly together, when put in their proper position without the bust. Small depressions must now be made in the front and back edge of the piece E, at the places marked C. Having proceeded thus far, the three pieces must be greased and placed upon the bust, which will then have the appearance that is represented in Fig.

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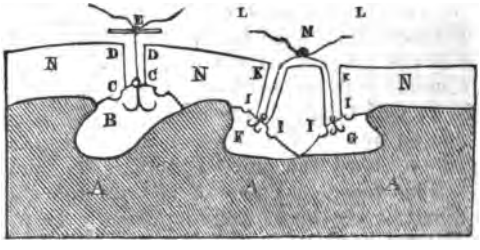
II. To finish the mould, the front and back, respectively, must be greased, and plaster then cast upon them. When dry, these pieces must be removed from the bust, and put together without it, and in this situation they will form a hollow mould, which must be seasoned, as will be mentioned hereafter, before it will be ready for use.

Fig. III.



It sometimes happens that internal pieces, as B, F, and G, of Fig. III, are required. These must be made first, and a loop of wire be placed in each of them while soft. The keys, (CC and II) must not be forgotten. These pieces, when hard, must be removed, trimmed smooth, and well greased. A little glazier's putty must next be put around the loops of wire, and the pieces be replaced. The piece NNN must be cast next; when hard it must be removed, and the holes DD and KK must be bored entirely through it, where the loops of the internal pieces will come, or rather, where the putty made depressions. The internal piece (B) is fastened to the piece N, by passing a string through the loop of wire and through the piece N, and by tying the string to a stick at E. The pieces F and G are fastened in a similar manner by the strings LL, which form a knot at M. The letters AAA of the figure represent the object from which the mould described is supposed to have been taken.

In making moulds of plaster it is often necessary or convenient to make the sharp angles of wax. To do this, the place to be occupied by wax must be first filled with some soft substance, as lard or soap. The piece of the

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mould above this must then be made of plaster. When this piece has hardened, it must be removed, trimmed, and a large hole bored through it; remove the lard which was used to fill the cavity, and replace the piece of plaster. Thus prepared, the melted wax, which must not be hot, must be poured through the hole of the piece just made, and, on cooling, it will form the piece required. If a little resin is mixed with the wax, the corner will be harder.

Among the articles for making moulds, isinglass and common glue were mentioned. They can be used as follows:—Dissolve the isinglass or glue in brandy, by a slow fire. The article to be copied must be oiled, and the solution be poured upon it, and suffered to remain until it is hard. This method is used in copying medals, seals, and coins, but is an inferior mode of doing it.

Moulds are made from tin-foil and block-tin, by pressing the material upon the article to be copied. This requires great pressure, and must be done with a machine. Silver and bronzed medals, which would be defaced by hot sulphur, are copied in this manner.

After moulds have been well made, the next thing is to season them, so that they may not absorb the oil that is put on them to prevent their adhering to the figures which are to be cast in them. This process is quite simple, and is performed in the following manner:—The plaster mould is allowed to become perfectly dry. Two or three weeks are required for this, unless artificial heat is used. When perfectly dry, the mould is to be well soaked with *boiled linseed oil*, put on very delicately with a brush or sponge. In this state the oil is suffered to dry in the pores of the plaster; and when sufficiently dried, another very delicate coat must be put on, and perhaps a third; and when these last coats of oil have become dry, the pores will be all filled, and the mould sufficiently seasoned. Every time the moulds are used, they must be lubricated with the mixture of oil and tallow. When the mould must be broken to pieces, as is the case in taking casts of living heads, the mould need not to go through this course of seasoning, but may be prepared in the following manner:—A thick lather, made from common brown soap, must be

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put on the mould, very thick, with a brush. This simple process will prevent the mould from absorbing the oil, when you attempt to cast. Although this last way is very convenient, and saves much time, for the mould need not dry before it is thus prepared, and may be used immediately afterwards, nevertheless, the mould is apt to be soft, and is easily broken, and many fine parts are lost; therefore, except in the case mentioned, or when only two or three casts are required, the process first described had better be employed. Some artists, instead of seasoning their moulds at all, and oiling them each time they are used, prefer to throw into the mould a thick suds, made from soft soap and hot water; and, after having turned the mould round once or twice, they throw it out again, and cast in the plaster. This is a very bungling way, as the casts are not so clean, and no time or expense is saved in so doing.

When the moulds are made and well seasoned, there is nothing easier than to take casts from them. This is done in the following manner:—First, the mould is gently brushed over with a little of the mixture of oil and tallow; the different pieces of the mould are then put together, and secured in their places by a cord; next, the plaster must be mixed as described above, care being taken not to have it of too great consistency. All things having been done as described, the liquid plaster is poured into the mould, which is then turned around several times, till you are sure that every part of the mould is lined with plaster. When you are satisfied of this, the plaster which does not adhere to the sides of the mould must be poured out into the bowl, and be well stirred, to prevent its hardening. After the lapse of a few moments, it is again cast into the mould, and again poured out. This is done several times, until the figure within the mould has attained a sufficient thickness. The plaster which is left after casting the figure, is put with a spatula around the base of the cast, to make it stronger, and more heavy at the bottom. The mould must be left about an hour to stand unmolested; after which, the string which binds its parts together may be removed, and the mould, piece by piece, be taken from

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the figure. The figure thus cast will be hollow, which makes it light, and easy to be transported from one place to another. The seams must be removed, and the accidental holes filled up as will hereafter be described.

Casts are taken from flat moulds by merely pouring the liquid plaster upon them, after having been oiled, and leaving it to harden.

For taking casts from sulphur moulds, a rim of tin, half an inch thick, is necessary. This rim is put around the mould and secured. The olive oil is then put upon the mould with a brush, and the liquid plaster put upon it likewise with a brush. This prevents little holes occurring in the cast, which is a great desideratum in medal-casting, as medals cannot be trimmed and repaired so well that the repairs cannot be detected.

When *wax* is used for casting, care must be taken that it is not too hot. The mould must be oiled, tied together, and warmed, and the warm wax be thrown in and out eight or ten times, until the cast is sufficiently strong. When perfectly cold, remove the mould carefully.

The plaster or wax can be colored by any of the common coloring matters, care being taken, that no water be put into those which are to unite with the wax, or glue or gummy matter into those which are used for the plaster. Water and wax will not unite together without a third substance; and gum, mixed with plaster, greatly retards its setting. Of coloring casts more will be said hereafter.

It is often a gratification to have the masks of our friends; and as the mode of taking them is very simple, and causes very little inconvenience to the subject, a description of the manner in which they are taken will be briefly given. The individual is made to lie horizontally on his back, with his eyes shut, his hair and eyebrows brushed properly, and well smoothed with pomatum. A napkin is placed around his head, to prevent the plaster from extending over the other part of the hair and the ears. A goose-quill is fixed into each nostril by a piece of paper or cotton. Thus made ready, the eyebrows, hair and eyelashes must be gently rubbed over with olive, or with almond oil, which is much pleasanter. The rest of the face

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need not be oiled. The plaster is then put on the face, care being taken not to stop the cavity of the quills. At first, the face should be but *thinly*, though *entirely* covered with the plaster. When this first coat has become pretty hard, a little more plaster should be heaped on, to the thickness of three fourths of an inch. The plaster having become tolerably firm, the quills are to be removed by extraction. When hard, the mask is to be removed from the face, by first taking away the napkin, and then, by carefully lifting it from the forehead first, and then from the rest of the face. The subject should then wash the plaster from his eyes, before opening them. The plaster would feel more pleasant, and would harden quicker, if mixed with warm water. This precaution will take away the shock which is generally experienced when the plaster is first put on, and which is apt to leave a frown on the expression. The whole process of taking a mask requires only *ten minutes*, and gives, when carefully done, a correct model of the face. This mould from the face can be seasoned with soap, and a cast made in it. To remove the mould, recourse must be had to the mallet and chisel, unless it (prior to the plaster being cast into it) is divided vertically (i. e. from the forehead, between the eyes, and through the nose, mouth and chin,) by a very fine saw. The mould should not be entirely cut through, although all the outline should be well sawed, and the remainder should be broken. The roughness of this fracture will serve as a key to retain the pieces of the mould in their places. A smooth cut with a saw would not allow this.

Moulds in the *whole head* are taken in a similar way. The person must sit upright, his hair must be smoothed down by a brush and pomatum, his ears be stuffed with cotton, and a quill be put into each nostril, as represented by D, in Fig. IV. A small cord is to be placed from B to A, and then over the head to the other side corresponding to B. Another small cord (AC) is to be placed from the line crossing the vertex, and continued down in a median direction to the nape of the neck. The use of these strings is to cut the plaster just before it is hard, and by this

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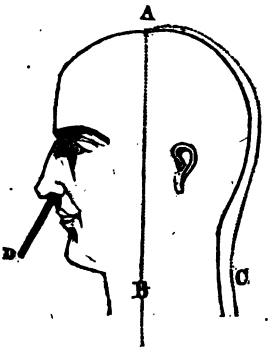
Fig. IV.



means, to facilitate the removal of the plaster shell from the head. Having thus made your subject ready, his head is to be *entirely* covered with the liquid plaster. All the plaster to be used must be put on at one mixing, and when it shall have attained the proper degree of hardness, the strings must be removed in a manner so as to divide the whole shell into three pieces; one to contain all of the face except the ears, the other two, respectively, to contain each an ear and all of the shell between the line AC at the back, and the line AB from the top of the head to the point B, indicated in the figure. When the plaster is sufficiently hard to retain its shape, it should be immediately removed from the head.

To get a model of the head from this cast, it must first be prepared with soap as heretofore mentioned; the pieces must be put together so as to form a mould; into this mould the plaster must be cast, until the cast within has attained a great thickness; after which, the shell must be removed with a mallet and chisel. In using the chisel, great care must be taken not to destroy the ears of the cast. When the cast is made, it can be put upon a pedestal, the eyes be opened and the hair trimmed.

It often becomes necessary to fill up accidental depres-

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sions in casts. To do this, the surface of the depression is first made rough by any pointed instrument; it is then moistened with water, and plaster is put into it and smoothed over with a knife. If the cast has just been made, and has not become dry, a little of the substance of the cast can be scraped off and used for the filling of such defects.

Casts are mended by making the edges to be joined together rough and moist, and by putting a little newly mixed plaster between the two pieces, as a cement. The pieces having been pressed together, the superabundant plaster will be squeezed out, and can be removed by the knife. When figures are cast in parts, the different pieces are united in the same manner.

After casts have been made, the seams caused by the mould are to be removed by the knife. The cast is then put away until it becomes dry, after which it is smoothed by very fine sand-paper or dog-fish skin, and polished by the Dutch rush. The rush is moistened in water, and after the surplus water has been pressed out by the hand, it is capable of giving the cast an exquisite smoothness.

The following is the method adopted by artists to give their casts a polish which shall resemble marble. They are first made smooth, and brushed over with a mixture of soap and white wax. A quarter of an ounce of white soap is dissolved in a pint of warm water, and an equal quantity of white wax is afterwards incorporated with it. The cast may be dipped into this solution, or be washed with it plentifully. After an hour's drying, it is polished by rubbing it with soft linen or flannel. A polish produced in this manner rivals the nicest work executed in marble. Other methods are adopted to produce this resemblance to marble, but as the one described is the best, the others will not be mentioned.

If casts are to be exposed to the inclemencies of the weather, they can be made more durable by filling their pores with boiled linseed oil, with which wax or resin has been blended. After this preparation they can be painted with white-lead, or varnished.

There are many modes of bronzing laid down in books,

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but the following is the most preferred, on account of its simplicity, and of the readiness with which all the articles may be procured. When plaster casts are required to resemble bronze figures, they must be first trimmed and made smooth. The next step is to cover them well with a size, made by melting rosin in a cup, and adding to it a sufficient quantity of oil of turpentine to give it the consistency of oil paint, and a little lamp-black for its color. When this size has been permitted to dry, the cast will appear black and without polish. The cast is now ready for a coat of paint, made of varnish and coloring materials. Perhaps the best color is made by a mixture of *chrome green* and *lamp-black* well blended together. This must be put on with a brush, and when dry, a little Dutch metal, or, as it is known here, *copper bronze*, must be mixed with a little of the paint or varnish, and be rubbed on the most prominent parts of the cast. A coat of copal varnish must be put over all, after the casts are dry. When done well, casts will resemble figures cast in bronze. The cheapest and most satisfactory way, however, is to get articles bronzed by those who are well practised in the art, and to whose profession it immediately belongs, viz., the painters.

Next to bronzing, the best way to prepare casts is to paint them with dead white paint, i. e., with white-lead mixed with other materials in such a manner as to dry without a gloss. Casts painted in this manner soon attain the complexion of human flesh.

Having completed, in a hasty and concise manner, an account of the method by which the whole trade of casting is performed, it is hoped that some advantages may be taken of it by many of the sciences, and especially by that which treats more particularly of man. Much interest is now taken in the fascinating study of Phrenology, and as this science depends upon proofs which must be brought immediately to the sight and touch, it is likewise to be hoped that the few rules which have been here given, and the simplicity of the process described, will induce all connected with this study, to secure for inquirers,

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all cases remarkable for a deficiency or overshare of any faculty.

To the amateur, antiquary, painter, surgeon, and the different artists, it would be useless to mention the various uses of the above described art; for they, and they alone, know the advantages it can afford them in their several pursuits. Z.

[Furnished for the Tracts and Lyceum.]

RATIONAL ANALYSIS.

I AM aware that the subject of the Quadrature of the Circle has, ere this, become stale and uninteresting to many readers of the Tracts and Lyceum; and it is curious to know what circumstance could have thrown this oblivious matter before the public at this time; being a subject which, from the numberless abortive attempts to gain public attention, only evinces that those who have paid but little attention to it, but little regard it; and those who have paid more attention to the subject, regard it still less. But should the subject be likely to excite too much interest, or to engross too much attention, it is, doubtless, in the power of those whose business it is to 'instruct the planets in what orbs to run,' who hold dominion over the almost inscrutable laws of geometry and mathematics, to again place the subject (for the time being, at least,) in that oblivion where it has so long rested, save now and then, when disturbed by some presumptuous spirit, who, from some cause or other, is unwilling to submit to the powers that be.

I have been led to the foregoing reflections, from having observed in the last Tracts and Lyceum an article on the subject of the quadrature of the circle over the signature O. S., in which all flights of fancy or imagination on the subject, like delusive hopes, are at once merged in those supposed sad realities, to which all must finally submit, however unpleasant the reflection.

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I notice, however, the writer refers to a method which he understands to be in progress, of solving the celebrated problem by means of spherical logarithms, whereby the solution is to be given in full, without the aid or trouble of approximation: the meaning of which I take to be, that, if the circumference of a circle be definitely expressed by some given power of its numerical quantity, the diameter also of such circle may be definitely expressed by the like or some other power of its numerical quantity; in which case the area *would* also be definitely expressed by some given power of its numerical quantity.

Mr. O. S. has not informed us who the person is, thus engaged, but thinks the subject the same referred to by me, in a former number of the Tracts and Lyceum. If it be the same, it is the same to which I now refer, the author of which I shall familiarly call the author, with whose labors on the subject I have been acquainted, and to which I am permitted to refer, so far as is contained in this article. But, as the author has entertained thoughts of furnishing to the world an epitome or synopsis of his work, through the medium of the Journal of Arts and Sciences, published at New Haven, Ct., in case he can obtain permission, I shall go no farther in this article than merely to give some hints relative to the plan of the work, so far as is contained in the first chapter, which is divided into several sections, each consisting of several pages, and is measurably devoted to explanations of the principles of numbers and their phenomena, of the symbolic language of the work, and of the logarithmical or geometrical tables. I am satisfied, so far as I have been able to examine the work, that it is wholly unique in design and execution; and this the author justifies on the ground that nothing would be gained by following too closely the beaten track of others. His object, however, seems to have been to simplify, as far as practicable, and to bring the work as nearly within the comprehension of all who may see fit to examine it, as possible. But it is manifestly a total aberration from the manner in which numbers have in general been treated; and should it ever go forth to the world, its

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fate, without the merits, may be similar to the book described in one of Milton's Sonnets, as follows:

> 'A book was writ of late called Tetrichordon,
> And woven close, both matter, form and style;
> It walked the town awhile—now seldom pored on:
> Bless me, cries one, why what a word on
> A title page is this,' &c.

And the author declares that, in the event of its thus going forth, he shall feel himself happy, if it does not cause the death of some few well favored professors by outright laughter.

The author, I believe, makes no pretence to performing impossibilities; he does not suppose the circumference and diameter of a circle to be commensurable in the second degree of numbers, or the second powers, nor does he suppose that an algebraical expression will at all assist a numerical developement of a quantity that must necessarily consist of a surd root; but he seriously doubts the correctness of the numerical developement of the ratio of the diameter to the circumference, to the extent it is generally supposed to be obtained; and although the world in general are satisfied that its correctness is sufficiently extensive, still the author endeavors to prove even this to be disadvantageous error.

But I will proceed with the task assigned me, viz., a hint at the subject-matter contained in the first chapter of the work.

The first section is mainly devoted to the introduction and explanation of the more common signs used in the work (which are composed of letters of the alphabet or other characters,) to denote ideas or expressions which constantly occur, and which by a constant repetition in words at length, would not only become tiresome and monotonous, but would not give so distinct and definite an idea as when expressed by characters.

I do not, however, think his symbolic language, or vocabulary of signs and characters at all terrific, but rather short, simple, distinct, and easily learned and retained in the mind. The author has, however, taken some liberties for which he may be severely censured, unless he can

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show complete justification. I shall not now expose the extent of his trespasses, but will name one of some importance, viz.: the sign commonly used to denote multiplication, he has converted to his own use, and has endeavored to substitute another in its stead; and the excuse or justification relied on is, that the economy of lines will furnish no other character applicable to the extensive use to which he wishes to apply it.

The second section treats of geometric quantities in general, which are but the component parts of solids, as being all contained in and upon geometric solids; the *distinct* portions of the surface of a solid being called faces, and being tantamount, when abstractly considered, to plane or curved areas.

The third section treats of the classification of geometric solids, the first division being into regular and irregular; and as the inquiry chiefly relates to regular solids, the classification is, in reality, that of regular solids: and the fourth section consists in the classification of the plane faces of regular solids, or of plane regular figures or areas.

The author has, in those two sections, undertaken to draw out and distinguish what may properly be called regular geometric quantities, and to classify them according to certain apparent resemblances, the quantities of which, when subjected to numerical admeasurement or calculation, present similar results, or like phenomena: and to this end, the author has, in some instances, intruded upon the geometric nomenclature, by appending to certain names adjective endings; or by some addition to some primitive or generic name, denoting thereby the derivative: and perhaps the propriety of such intrusion will be acknowledged whenever that of a classification shall be.

The fifth section relates principally to the numerical admeasurement of regular polygons, or rather, to the preparation of certain facilities for that purpose, viz.: by showing where to locate, within the bounds of numbers, what he has seen fit to call the *adjuncts* and *junctives* of *all* regular polygons: the adjuncts being calculated or intended (by the joinder of two letters) to denote the fixed numeral positions in which the area and some important

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line of a polygon meet; and the junctives being intended to denote the fixed numeral positions of all regular polygons: that is, a junctive denotes the numeral position in which like phenomena occur from like numerical calculations, applied to any kind of regular polygons. And perhaps this section is not the least useful, in the preparation for eliciting the ratio of the diameter to the circumference of a circle.

The sixth section treats of numbers, or rather, of numerical quantities and positions, as applicable to the admeasurement of all geometric quantities, and of the ratios and proportions of numerical quantities, and is rather a preliminary to the seventh section, which is composed of a logarithmic or geometric table, with the principal adjuncts and junctives annexed, with a short explanation. This is by no means formidable.

The eighth and last section may, perhaps, be esteemed rather more formidable, it being intended to develope or disclose, by means of known and assumed ratios, existing between important lines of the circle and similar lines of its inscribed and circumscribed squares, the true ratio between the diameter and circumference of the circle, which are to result in definite numerical expressions, when involved or evolved to their requisite roots and powers.

Whether the results which are supposed to lead to the final result, according to this method, be true or false, we all the way proceed from certain fixed landmarks, to some certain goal, with our eyes open; each result apparently arising from, or having place in, the relations of the mind, —in the laws of human thought; still being simple and easy of access.

Perhaps I cannot, at this time, better comment on the present section, than by referring to the formula, which I stole from the original, (a little marred in form, as I afterwards discovered,) and furnished for a former number of the Tracts and Lyceum.

It may be supposed, that this method, should it ever be understood, would not essentially differ from an approximating method, and perhaps, from those already extant;

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but I believe, whether it elicits the truth or not, it has nothing to do with those methods, nor has it any similarity to them whatever. In this, there is no numerical quantity lost or gained, any more than would be the case in the expression of surd roots by algebraic symbols, until we arrive at the final goal. And perhaps a similitude drawn from Hill's old arithmetic, in the annunciation of a theorem, together with the result, and his comment thereon, may not be wholly inappropriate in the present instance, viz :

'In any geometrical progression whatsoever, decreasing and continued *ad infinitum*, it holds—as the common difference, minus unity : is to unity :: so is the first or greatest term : to the sum of all the following terms, *in infinitum;* and hence the least term vanisheth.' And now for his comment. 'This may appear strange to many, how it should be possible to give the sum of an infinite progression in numbers ; whereas, if the work were actually begun, and the terms continued, it would, after a thousand years' labor, and after thousands of millions of terms, never be nearer finishing. And yet that the sum of this infinite progression should be so easily found, it appeared to me, at first, as a notion (if I may so speak) almost divine,' &c.

But, in justice to the author of the subject-matter hinted at in this article, it is here proper to state, that he does not assume or claim any supernatural power or agency. He claims not to have done more than any other individual might have done, whether it be what they *would* have done or not ; and, as in the old legal trial by *battel*, he avers 'that he has not upon him neither bone, stone, ne grass ; nor any enchantment, sorcery, or witchcraft, whereby,' &c.

To conclude, it is not my province to say, whether the author's theory (if such it may be called) is true or false : if it be true, then indeed may fancy and imagination intrude themselves into the field of mathematics; nor will they be easily expelled. A. Y.

March 29, 1834.

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[Furnished for the Tracts and Lyceum.]

POPULAR BOTANY.—No. III.

BOTANICAL NAMES.

THE Latin names of plants, used by botanists, are founded on the principles of genera and species, explained in the last number. English names are frequently made to correspond with these distinctions, but the Latin names always agree with them. A name is given to each genus, and the species belonging to each genus are denoted by adjectives, expressing, in Latin, some quality of the plant, as *elegans*, handsome; *purpurea*, purple, &c. Thus *Rosa alba* means white rose; another species of rose is called *Rosa Gallica*, or French rose. The Latin words 'alba' and 'Gallica' (white and French) come after Rosa (rose) instead of before, as in English. In the same way they say in French, *table ronde*, (table round) instead of round table, as we do. As I may have frequent occasion to use the botanical names, I thought it proper to explain them in the simplest manner possible, and I shall endeavor to give with them the correct English signification. And here I cannot help expressing a hope that we may soon see a beautiful structure of botanic nomenclature built up in our own language, accessible to every one.

NATIVE PLANTS.

The plants of our country, though much neglected, are, undoubtedly, if we knew how to estimate them, an invaluable treasure. Without entering into the enthusiastic notions of itinerants and quacks, who, without difficulty, can make earth produce remedies for every disease, I doubt not that the service which the medicinal virtues of some plants might render would be immense. The Indians were acquainted with the virtues of many plants, and used them successfully in the cure of the few maladies to which they were subject. They, too, knew how to stay the venom of the rattlesnake. But they are gone; and with them have perished, in a great measure, their knowledge and their acquirements.

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Among other things, the confusion of names, of which I have spoken, forms a serious obstacle to the communication and obtaining of information concerning our plants. Those who profess to be acquainted with them are frequently ignorant persons, who, if they really know any valuable remedies or other useful properties of plants, cannot be relied upon in the descriptions or names they give. The medical profession usually find it cheaper to buy their roots ready dug, ground and labelled, than to seek and prepare them themselves. That the properties of our plants have not at all been investigated, I do not say; but I do say, that they have not received that attention they deserve. Not only their medical properties, but their uses in numerous branches of the arts, sciences and domestic economy, remain an almost unexplored field; and we may, in course of time, find ourselves in possession of treasures we little think of. And I should be happy were I to be successful in the endeavor to point out some of the openings upon this field. The worth of a science is, invariably, especially by those who form the great mass of society, measured by its actual utility in the service of the wants and conveniences of mankind. On this point our science has much to gain, and needs to be studied more particularly in reference to this.

CULTIVATION OF EXOTICS.

The important object of horticulture is, to assemble together, for the inhabitants of one climate and one country, the valuable productions of many countries. It is but justice to remark that our horticulturists are deficient in attention to what ought to be the great object in view in this department. Plants merely showy and ornamental are allowed to absorb the attention, and take the place of others, whose introduction might, on account of some important properties, prove a lasting benefit to the country, and insure to the introducer the gratitude and thanks of posterity. St. Pierre, the French naturalist, proposed to erect monuments to those who had thus contributed to the vegetable wealth of his own country. A beautiful idea this;—but to whom could *we* erect such monuments?

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We know not yet to what extent the process of naturalizing plants may be carried; but there is no doubt, that by a systematic course of practice, much more advantage might be taken of it than is actually done. Enough has already been effected to induce us to believe that much more is possible. Nature does, by degrees, adapt herself to soil and climate; and, though the view may be regarded as visionary, it is certainly not contrary to analogy, to presume that future ages may see the rugged soil of New-England flourishing with the rich and costly productions of the torrid zone. But, independently of such views, I would urge the horticulturist, the florist, and the naturalist, to consider the subject, and to aim, in the prosecution of their business, to advance, in this way, the happiness of mankind, and especially, the prosperity and national advantages of our country.

TIMBER-TREES AND FUEL.

Our country is rich in useful forest trees. Besides representatives of all the species of Europe, we have numerous others, utterly unknown in that quarter of the globe. The timber-trees of France and England are but about thirty-seven species, whilst we possess more than a hundred.

The rapid consumption, and, we fear, in some instances, improvident waste of wood-fuel, affords some cause of alarm, lest, ere many years shall have passed away, we shall be deprived of the valuable services our forests are now rendering us; that, unless special measures be taken to preserve the growth of wood, we shall be able neither to build proud ships upon our waters nor to frame dwellings on the land, nor to enjoy our pleasant wood fires. We may, and soon must, build with stone and burn coal, both in country and city.

But, for the beauty of our lands and of our landscapes, spare the trees. For the health, comfort and advantages of agriculture they may preserve to posterity, spare them. They are guardians of our soil. How much the preservation of a healthy climate, and especially of a sufficient degree of moisture in our atmosphere and earth may depend upon them, cannot be said; nor how far local cir-

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cumstances, civilization, and cultivation may exert their influence in this matter. Deserts are mostly quite destitute of trees, and where trees are found, even in the midst of deserts, there will water be found. In a country so near the sea as ours, the destruction of the forests might produce no serious consequences; but farther inland, the effects might be no less than reducing the land to the desolate condition of the prairies of Central America, inhabitable only by the Arab-like Indian wanderer. Egypt has, evidently, since ancient times, been continually losing her fertile ground, by the incroachments of the sands of the desert, which have reduced her whole cultivated lands to the very banks of the Nile. Trees are rare in Egypt. From instances of this kind, which might be multiplied, the reader is left to draw his own conclusions. B. B.

[Furnished for the Tracts and Lyceum.]

MUSIC.

[CONTINUED FROM PAGE 249.]

Among the fine arts, a relish for the higher and more complicated efforts of genius, is *an acquired taste*, and can be felt only by those who have made the subject a matter of study, or have been accustomed to an habitual observation of such excellencies. Refined music speaks a language which is felt by all those who possess the power of moving the soul beyond what human genius, by any other means, is able to effect. But, from the very fact of the universality, generally speaking, of a taste for some of its beauties, has arisen, in this country, the circumstance which has contributed most to check its progress. The generality of men, feeling intensely the charm of those simple airs to which they have been habituated, and, perceiving at first no beauty in the more complicated music of foreign countries, have been naturally led to imagine that there is something artificial and incomprehensible in such foreign productions. They have, consequently, ad-

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hered with obstinate, though very natural patriotism, to the music of their own country; and without attempting to understand the higher efforts of the art, or to unravel the charms of foreign masters, have rested in the firm belief, that everything from which they derived no pleasure, was, in reality, destitute of beauty; and that the only species of music truly worthy of admiration, was that which came home alike to the heart of the most uninstructed, and the most cultivated part of the audience. Professional men, on the other hand, being led by the study and cultivation of their art to a strong and ardent admiration of those higher branches of music in which its greatest powers are developed, and finding themselves surrounded by persons incapable of appreciating what they felt to be delightful, have almost relinquished the task of improving and new modelling the public taste; but, associating entirely among themselves, and entertaining the most sovereign contempt for the taste of those around them, have created a language unintelligible to the rest of mankind, and established a criterion of taste deviating very widely from the rules of genuine beauty.

From such absurd and contemptible efforts of some of our professional artists has arisen a complete misconception of the nature of refined music. Hence it is, that the Italian compositions in music are thought to be characterized by long shakes and forced exhibitions of the vocal powers, which never would be tolerated upon the other side of the Alps. Nor has the effect of such facts been less injurious on the public taste than on the direction which the efforts of professional men have taken. Most men have relinquished all attempts even to understand an art, from the greater part of whose productions they could derive no pleasure. Hence has arisen the singular fact, that, in this country, there is so little conception of the beauty of Italian music, or so little exertion to comprehend the latent beauties of an art which addresses itself, more directly than any other, to the finest feelings of our nature, and in which, perhaps, the greatest triumphs of human genius are to be found. We are not to impute this extraordinary fact to any want of natural taste

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among our inhabitants, for there is no country more naturally inclined to the cultivation of music. It is to be imputed to the want of opportunities of acquiring a taste for the higher branches of the art.

There is a division in society which may be denominated the *musical* and the *unmusical;* the former comprehending persons intimately acquainted with the rules, the technical expressions, and the profession of the art; the latter, the whole remainder of the people, whose natural taste has received no cultivation. Both parties entertain a sovereign contempt for each other. The *musicantes* regard the rest of society as utterly ignorant, and beneath all contempt in the estimation of the art; and they, in their turn, are regarded as a trifling and despicable set of men, who, according to Adam Smith's distinction, have degraded themselves by devoting their time and talents to the arts which *please,* in place of those which *serve* mankind.

P******.

[TO BE CONTINUED.]

AMERICAN PLANTS.

THE catalogue of hitherto known native and naturalized plants of North America, made by that indefatigable and learned botanist, Dr. Muhlenberg, contains but 863 genera, and not 2,800 species. It is not unreasonable to estimate the whole number of plants in the United States and their territories, at 8,000; and as yet, we have not described 6,000. What an opening does this afford for the operations of scientific inquiry! No wonder that Linnæus was so anxious to visit this country. Catesby, in his Hortus Europæ-Americanus, published in 1767, truly observes, that a small spot of land in America has, within less than half a century, furnished England with a greater variety of trees, than has been procured from all the other parts of the world, for more than a thousand years past.

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ORIGINAL MISCELLANY.

REMARKABLE TREES.—M. Schomburgh recently read a paper before the Royal Linnæan Society, on remarkable trees, in different parts of the world. His observations particularly concerned a silk-cotton tree—*Bombax heptaphyllum*—of gigantic dimensions, growing in the island of St. Thomas, West Indies. The circumference is 34 1-2 feet, and its horizontal branches extend 120 feet.

ANTIQUARIAN.—The Dean of Wells, England, has given his views in relation to a crosier, lately found near the cathedral of Wells, which he supposes was made in the 12th or beginning of the 13th century, and probably belonged to Severicus, who was bishop of that diocese in 1192.

CLIMATE.—M. Arago, a philosopher, has advanced the opinion, that the climate of France is gradually becoming colder. He supposes the advance of the north polar ice towards the temperate zones, to be the cause. Mr. Barrow has advanced a similar notion concerning the climate of England.

GREAT MUSICAL FESTIVAL.—In the course of July next, a magnificently conducted musical festival, similar to that in commemoration of Handel, is to take place in Westminster Abbey, under the direction of Sir George Smart, and the patronage of the king.

BOURRIENNE, extensively known as a writer of celebrated memoirs, recently died—so say the French Journals—in a mad-house at Caen. It is moreover asserted that insanity was induced by a course of habitual intemperance.

GRESHAM INSTITUTION.—By the will of Sir Thomas Gresham, an ample estate was left in trust to the corporation and mercer's company, for the delivery of lectures on civil law, astronomy, music, divinity, geometry, and other subjects; and in times past, able

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men were employed to deliver them; but a high degree of indignation is manifested in the English papers, at this time, at the scandalous manner in which a few persons have managed to *manage* the whole business; and, what is worse than all, have been palming off their own vile stuff for lectures, and so pocketed the money.

TABULA PHILOLOGICA.—With this title, a sheet has been engraved, four feet long and three broad, the largest, so it is said, ever engraven, having on it a *synoptic table of all the languages of the universe*, by M. Florent Galli. The deductions from all known tongues begin with the personal pronoun *I*.

BATTERING RAM.—Mr. Wilkinson, in a lecture before the London Society of Arts, had occasion to speak of the ancient battering rams. It was his opinion, that one of those instruments, weighing 42,000 lbs., worked by a thousand men, did vastly more execution than a cannon ball of 36 lbs., shot point blank. In the course of the same lecture, he exhibited the walking staff of King Harry V, which was a terrible looking affair—seven feet long, and loaded at both ends with iron knobs and a spear-like point.

AGRICULTURAL WASTE.—Only one third of all the seed-grain sown, it has been estimated, grows, even on the best land. In Great Britain and Ireland, the number of cultivated acres is not far from 47,000,000, of which, 30,000,000 are tilled by the plough. Two fifths, about 12,000,000, are under annual cereal crops. As the average quantity of seed sown is four bushels and two thirds, (of wheat, rye, barley, &c.) the whole quantity scattered must be equal to 7,000,000 quarters. The quantity, therefore, entirely wasted, would support 1,000,000 of human beings.

ANTIQUES.—M. de St. Sauveur, French consul at Salonica, has presented the king some rare antique marbles, found in Macedonia, consisting of the heads of divines and kings, funeral monuments, inscriptions, a colossal bust, supposed to be that of Persius, the last king of Macedon, and another of Diana.

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COFFEE.—The quantity of coffee annually supplied by Arabia, is supposed to be upwards of 14,000,000 of pounds. Before the commencement of the French revolution, St. Domingo alone exported more than 70,000,000 pounds per annum. The consumption of this article, among the Mahomedans, is truly astonishing: all who can possibly obtain a supply, drink it at least twice a day, very hot, and without sugar or milk. Beaujour, in a work on Greece, speaks of a *theriacophage*, or opium eater, who drank *sixty* cups of this kind of coffee in a day, and smoked as many pipes. Formerly, in Egypt, the drinking of coffee was regarded almost as a religious ceremony, and was drunken only on Monday and Friday evenings, accompanied with solemn prayers.

FOSSIL SAURIAN REPTILES.—Dr. Hibbert, a few months since, read a highly interesting paper before the Edinburg Royal Society, descriptive of the limestone bed of Burdiehouse, about four miles from the city, which, he was sure, indicated the previous existence of a lake at that place, as fossil remains of fresh-water fishes and reptiles were found in it. The reporter, after some minute observations upon the paper, goes on to say that this discovery is one of the most important which has been lately made in geology. It refers to the existence of reptiles allied more or less to crocodiles, at a period much earlier than has been generally supposed by geologists, and, at the same time, shows that those immense animals must have existed coeval, perhaps, with the very first vegetable productions of the globe.

LATE SCIENTIFIC WORKS IN ENGLAND.—Curtis's British Entomology; Vol. X. Transactions of the Society of Arts, Manufactures and Commerce; Parker's Chemical Catechism, *thirteenth edition;* The Philosophical Transactions, 1833—part II; Hooker's Botanical Miscellany; Inquiries concerning the medium of Light, and the form of its molecules, by Rev. John G. Macvicar; A century of Birds from the Himalayan mountains, by John Gould; Popular Introduction to Experimental Chemistry, by F. Watkins. None, or but a few of these, have been republished in this country.

MALT.—An English writer supposes the actual quantity of malt consumed in the United Kingdom, to be 33,000,000 of bushels, annually.

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THE NAME OF A MUMMY.—Mr. Pettigrew, in the College of Surgeons, so say some of the last journals, unrolled a mummy, carried to England thirteen years ago. Having explained to the audience the ancient process of embalming, he also explained the mythological characters painted on the cases, and predicted, from his knowledge of the Egyptian hieroglyphics, that the mummy before him was a male. His observation proved true. It was a male, whose name was '*Horseisi, a son of Naspihimegori*, an incense-bearing priest in the temple of Ammon, at Thebes.' By the best calculation, it had been embalmed two thousand years. Never was a public meeting more interesting to all classes.

GALVANISM.—If a living frog, or the fish called *flounder*, having a piece of tin-foil laid upon the back, be placed upon a bit of zinc, whenever the communication is made between the two metals, spasms will be excited in their muscles.

By placing the tin-foil over one eye, in a dark room, and holding a piece of silver in the mouth, as often as the edges of the two are made to touch, faint flashes of light will be seen, like lightning.

A MUSICAL KITE.—By leaving a large round hole over the back-bone of a common paper kite, and stretching strings across it, in the manner of an Æolean harp, while floating in the air above, it will give, in an audible manner, the sweet tones of that instrument.

NEW MEDICAL SCHOOL.—From a voluminous pamphlet of 113 pages, entitled 'Thoughts on the Policy of establishing a School of Medicine in Louisville, &c., by Dr. James Conquest Cross,' in which Dr. Caldwell, of Transylvania University, is handled without gloves, it is inferred that a new School of Medicine is about being organized.

A NEW SUBSTANCE DISCOVERED IN OPIUM.—Mr. Pelletier announces the discovery of a new substance in opium, which he has denominated *paramorphia*. It has a very marked action on the animal economy; and in very small doses, kills a dog in a few minutes. M. Magendie has proved that it acts upon the brain and occasions convulsions.

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TITLES.—There is no country on earth, where the love of title prevails to such a laughable extent as in Germany. Even a common taxgatherer's wife is affronted, if she is not addressed as *Frau Steuereinnehmerin*, or Mrs. Taxgatherer. County court counsellors have the sweetly sounding title of *Oberlandesgerichtsrath*. In China, a permission from the emperor of the celestial empire to wear a peacock's feather, is no more ridiculous.

ANCIENT AMERICAN CITY.—A German merchant at Valparaiso, in Chili, having employed a Dane, by the name of Kenous, to explore the wild regions of Chili, he has discovered the scattered ruins of a great city. In other parts of South America, traces of a high degree of civilization have been discovered, which, with many other circumstances, prove very clearly to antiquarians, that a race of men preceded the Indians, highly cultivated, and thoroughly acquainted with architecture.

A NEW METAL.—Prof. Breithaupt, of Freiburg, has found a new substance, possessing remarkable qualities—*native iridium*. Platina has long been considered the heaviest metal, but the professor proves that *native iridium* is two parts heavier, viz., 23·3 to 23·6; platina, on the contrary, is only 21·5.

MAGPIE, *Corvus pica*, which is a native of the north-western parts of the United States, when taken young, may be easily domesticated, and taught to pronounce not only single words, but sentences. Plutarch speaks particularly of the interest which was excited by one of them, in his day, owned by a Roman barber.

CONVERSAZIONE.—At the commencement of the first conversazione for the season, at the London University, Dr. Lindley delivered a lecture upon the nature of the ancient plants, by the remains of which the beds of coal at Newcastle have been formed. It was pretty clearly shown, by actual remains in the coal, that the scenery of the north of England must have once been ornamented by palms, tree ferns, gigantic cacti, tropical coniferæ, and other enormous plants, which are now characteristic of equatorial latitudes.

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NEW SPECIES OF CHAMÆLEON.—Mr. Stutchbury, curator of the Bristol Institution, has discovered a new species of chamæleon, to which he has given the name of *cristatus*, from its peculiar dorsal crest, supported by spinous processes of the vertebræ, by which character it approaches the basilisks. The specimen which the gentleman has obtained, came from the banks of the river Gaboon, in the western region of Equinoctial Africa. The color is dark ash-gray.

MARYLEBONE LITERARY AND SCIENTIFIC INSTITUTION.—The following gentlemen, whose names are well known in Europe and America, gave popular lectures, the past winter, in this institution, which is conducted very much like our lyceums, viz., Dr. Lardner, Dr. Ritchie, Dr. Copeland, Dr. Southerwood Smith, Sir A. Carlisle, Messrs. Burnet, Taylor, T. Phillips, Wallis, Brayley, Jr. and Hemming, the president of the Institution. The lectures continued six months.

ROYAL OBSERVATORY OF OUDE.—The king of Oude is about establishing an observatory, in his capital of Lucknow, in which the principal room will be fifty-four feet long, twenty-five wide and twenty-five high. Messrs. Troughton and Sims, of London, have been directed to construct for his majesty, a mural circle, six feet in diameter, and a transit instrument of eight feet focal length.

CROOKED GUNS.—Recent experiments, carefully instituted, show that a smooth-bore barrel, if bent to the right, will throw a ball considerably to the left of the object aimed at, and vice versa.

ROYAL SOCIETY OF EDINBURG.—At a late meeting, Dec. 2d, the *Keith biennial prize*, consisting of a gold medal and a piece of plate, was presented to a Mr. Graham, for a valuable paper on the diffusion of gases.

PRIZES.—The French Academy of Inscriptions and Belles-Lettres, decrees, yearly, two sets of prizes; one for acts of virtue, and the other for writings the most useful to morals. In 1833, it assigned, for acts of virtue, one prize of 6000 francs, two medals, one of the value of 3000 francs and the other of 1500, and seven medals of the value of 600 francs each. Of the eleven, eight were decreed to females.

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TO CORRESPONDENTS.

Mr. Davidson has exhibited a very critical knowledge of the subject which he has had the goodness to send.

Nebulous has selected the very cognomen we should have given him. He is prodigiously cloudy and mysterious.

K. M. will invariably have the advantage, by laying us under obligations.

R. S. L.—Je n'y comprend pas.

A. A—?—Yes, law or anything else that can be of the least possible benefit. In answering this, we can again say, with propriety, that contributions are solicited in every department of human knowledge. Nothing comes amiss, if well and carefully written.

——— * *, of Windsor, Vt., is too late in the day, his views having been anticipated by a writer in volume third, of the Scientific Tracts.

P——, as usual, is in the right, and therefore, like the setting sun, which appears larger at its going down.

Something New,—is old as the hills.

Halifax.—When the next mail packet arrives, send the remainder, and if as good as part first, both will be published.

———, from Fryeburg, Me.—not original.

———, from Quebec,—excellent.

———, from Newark, N. J. Answer:—We should be gratified, and so would our patrons.

H. S. K.—Throw the lead often, friend; it will never do for your barque to leave soundings:

Little boats should keep near shore,
But larger ships may venture more.

The Constitution, By-laws, Catalogue of Members, &c., of the Concord Lyceum, forwarded by the politeness of Mr. Cyrus P. Bradley, will be particularly noticed hereafter.

An abstract of Mr. Fowle's Lectures, at the Temple, on Phrenology, which are particularly interesting, and original, too, are on file.

F. S.—Few, very few naturalists have ever been gratified with the sight; and positively interesting as the facts are, it would cost one his head, or what amounts to the same thing, his reputation, to tell the story to every body.

Newburyport.—Are you certain that the bat really sees without eyes?

Capt. Couthuoy's paper on the Luminous Appearance of the Ocean, will appear in the next number.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

MAY 15, 1834.

[Furnished for the Scientific Tracts and Family Lyceum.]

LUMINOUS APPEARANCE OF THE SEA.

BY CAPT. J. P. COUTHOUY.

'THEY that go down to the sea in ships, and do business in the great waters, these see the works of the LORD, and his wonders in the deep.' To the truth of this remark of the Psalmist, every person who has 'gone down to the sea' can bear witness. That mighty and unfailing reservoir is in itself, for sublimity and grandeur, a spectacle to which the land has no parallel. Whether its vast expanse is spread out calm and mirror-like, undisturbed, save by the long and heavy swell whose undulations have not ceased since at the word of their Creator, 'the waters were gathered together unto one place,' or broken up into liquid mountains by the breath of the fierce storm—it is alone in the severe majesty of its beauty,

'Unchanged, unchangeable, the eternity of Earth!'

But it is not for itself alone that the ocean is wonderful; wild and strange shapes people its depths and sweep over its surface. Glorious creatures replete with life and loveliness, beautiful in form and in hue more manifold than the rainbow, sport in its recesses and gladden the wide waste of waters by their presence. There the huge whale sluggishly heaves his mammoth form above the yielding element, marking his path by sheets of snowy foam, while 'out of his nostrils goeth smoke as out of a

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seething caldron.' Sullen and slow the shark glides past the fearful beholder, like a foul spirit unwillingly brought to the light of day; while the dolphin darts through the waves like a beam of molten gold, or the silver and azure flying fish speeds like an arrow over their crests; and far down where 'the purple mullet and gold-fish rove,'—

> 'There, with its waving blade of green,
> The sea-flag streams through the silent water,
> And the crimson leaf of the dulse is seen
> To blush like a banner bathed in slaughter;
> There, with a light and easy motion,
> The fan-coral sweeps through the clear, deep sea;
> And the yellow and scarlet tufts of ocean
> Are bending like corn on the upland lea.'

Among all the strange and wonderful sights however, which present themselves to the view of a stranger journeying over the ocean, there are perhaps none which excite greater surprise, or afford more pleasure, than the phenomenon which forms the subject of the present article. Who, that has witnessed this beautiful appearance, does not remember the inquiring wonder, the fanciful speculations, that arose in his mind, as he gazed for the first time, upon the flood of light which streamed off from the sides of the vessel, interspersed with gems of living lustre in every hue and shade of brilliance? Now, flashing far down in the dark blue water, like a gush of regal diamonds, now gleaming on the surface through the shadow of darkness like the torch of a fairy. Who has not hastened with almost childish eagerness, to examine the minute and glittering particles thrown within his reach by the spray, and too often regretted the inability or indifference of those to whom he turned for information? And who among the bravest, has not felt at least a momentary sensation of awe steal over, and his heart shrink within him, when, from one boundary of the wide horizon to the other, he has seen the ocean seemingly changed in its nature, and rolling like the fabled Phlegethon of the ancients, in waves of liquid flame.

The solution of these singular phenomena has long excited the research of the philosopher, and attracted the attention of the voyager. Many theories have been started to account satisfactorily for their origin. Silberschlag

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believed that their nature was phosphoric. Professor J. Mayer supposed the light to be imbibed by, and subsequently evolved from, the surface of the sea. By Gentil it was conjectured to arise from the presence of the electric fluid, because it was occasionally produced by friction. Others attributed it to the putrefaction of marine animals and plants. It is unnecessary at present, to examine the grounds for these opinions, as they are contradicted by all the later observations of naturalists. It is now generally conceded, that the luminous appearance of the ocean is attributable to the presence of innumerable small animals of a gelatinous substance, which emit their light by means of some secretion, the nature of which is, as yet, unknown. These animalculæ are mostly included under the generic term of *medusæ*. Their form and size vary from the refulgent *Medusa pellucens*, or transparent medusa, which sometimes measures eight inches in diameter, to the sparkling *Nereis noctiluca*, or night-shining nereis, which is so minute as to be scarcely perceptible to the unassisted eye. The *Cancer fulgens*, or lightning crab, a small species of shrimp, also possesses this property in a high degree.

The following, it is believed, are the principal varieties of luminous marine animals enumerated by naturalists:—*Medusa pellucens*, discovered by Sir Joseph Banks, during his passage from Madeira to Rio de Janeiro with Capt. Cook, on his first voyage. *Medusa noctiluca*, described by Forskal, is of an hemispheric form, near three inches in diameter, semi-transparent, of a reddish color with brown spots, the margin scalloped, and it has several broad tentacula depending from the interior. *Medusa densa*, also described by Forskal, seems rather to be a *Beroe*. *Medusa lucida*, discovered by Mr. Macartney an English naturalist, on the coast of England. His description states that it was about half an inch in diameter, the margin undivided, and surrounded on the inside by a row of pale brown spots, with numerous twisted feelers. Four dark lines crossed from the circumference to the centre, from which an irregularly shaped process hung down. When this was examined with a strong lens, it was found to be inclosed in a sheath, and that its extremity

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was covered with small cups or suckers, like those on the tentacula of the cuttle-fish. *Medusa scintillans*, first noticed by the same person, very small, transparent, and of a globular form; their motion slow and graceful, without any apparent contraction. *Medusa phosphorea*, found by Spallanzani in the Mediterranean, and from his description, similar to the *M. pellucens*. He represents it as extremely luminous, shining like a bright flame, and visible at the depth of six or seven fathoms. *Pyresoma atlanticum*, and *Beroe fulgens*, both found in the Atlantic ocean, and described hereafter. *Pennatula phosphorea*, commonly called the sea-pen, found in the Mediterranean. This animal's light is said, by Dr. Shaw, in his History of Algiers, to be so powerful that the fishermen are directed by it in arranging their tackle. The luminous effect is confined to the feather of the pen, or that part which is inhabited by the polyps. Spallanzani affirms that it is only visible when the sea-pen is moving about. The *P. grisea*, *P. grandis*, and *P. argentea* are also said to possess this quality. The *Pholas dactylus*, a bivalve shell-fish, found on the coasts which border the Mediterranean sea, is well known for its powers of evolving light. As long as eighteen hundred years ago, Pliny observed that every part of its body was filled with a fluid which, like phosphorus, illuminated everything on which it was rubbed. Reaumur confirms the above, and also noticed that the luminous property was communicated to water or any other liquid in which the animal was placed. *Limulus noctilucus;* this insect was found by Capt. Horsburg, author of the East India Directory, in the Arabian Sea. He compares it, in appearance, to a wood-louse, and says it was covered by a thin shell, from beneath which protruded a number of antennæ, or horns, like minute bristles. *Cancer fulgens*, discovered by Sir Joseph Banks at the same time with the *M. pellucens*. He remarked that its whole body was frequently illuminated, and emitted very brilliant scintillations. *Cancer pulex*, sometimes denominated sea-louse. The fact of this insect giving light is doubted by some, but the French academicians Thules and Bernard, assert that they met with

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it entirely luminous; and Hablitz, a German writer, states that on examination of a cable which sparkled on being drawn from the sea, he found it covered with the *Cancer pulex. Nereis noctiluca:* to the presence of this small creature the light of the sea has been very often ascribed, even by persons who never saw it. It is now however, believed to be a rare species, at least in the northern seas. It was first described by Vianelli, in 1749. To the naked eye it appears of a yellowish color, and about the size of an eye-lash. Under the microscope it exhibits many joints; the head has two short feelers, with a sort of horn between them. From the sides project a number of processes, transparent and containing a bunch or tuft of hair, and on the under side are similar processes, resembling the feet of the caterpillar. The above it is believed, are nearly all the marine animals which it is well ascertained are possessed of the faculty of exhibiting light. It will be seen that they are all of the simplest and lowest order of organization. It is not intended to give a full account of all these varieties, but merely to select a few of the most remarkable found in the northern seas, and mention some of the wonderful effects which beings so minute, are enabled by their great numbers to produce.

Perhaps in the whole tribe of luminous creatures, there are none more brilliant than the one designated by the discoverer M. Peron, as the *Pyresoma atlanticum.* It is from one to three inches in length, of a cylindrical figure, one of its extremities of a conical form, and the other truncated. The body is hollow, and destitute of any organs, except a very delicate structure resembling net-work; which lines the interior of the cavity. The exterior is covered with numerous small tubercles, which are the principal seat of the light, which is reflected in an almost incredible degree in the dark. At a small distance below the surface, the *Pyresoma* appears similar to a large ruby, giving out the same rich rosy tints for which that gem is remarkable. This creature is not unfrequently met with in clusters of the size of a man's head, when the appearance is extremely beautiful, not unlike the globes frequently placed for show in the windows of druggists.

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On taking one of them from the water and compressing it in the hand, a luminous, bluish white substance is effused, which remains but a few moments, and leaves the animal dead and lustreless. Another of these beautiful creatures is the *Beroe fulgens*, or shining beroe, about an inch in length, and of various colors. In shape it is similar to the last mentioned, and its appearance in the water is much the same. It collects also in numbers, but instead of clusters it is found in long chains. In some latitudes, they may be seen floating in myriads, of every hue and shade, from the deep green of the emerald, and the purple and violet of the amethyst, to the clear pellucid sparkle of the diamond. In a calm afternoon, near sunset, they may be observed lying in coils like snakes upon the water, or changing their form and position with every undulation. It was from a knowledge of this circumstance, perhaps, that Coleridge derived the idea of the following beautiful description, in that wild and thrilling poem, 'The Rime of the Ancient Marinere:'

'Beyond the shadow of the ship,
I watched the water snakes;
They moved in tracks of shining white,
And when they reared, the elfish light
Fell off in hoary flakes.

'Within the shadow of the ship,
I watched their gay attire;
Blue, glossy green and velvet black,
They coiled and swam, and every track
Was a flash of golden fire.'

It is in reality, difficult for the spectator to believe that all these varied and brilliant appearances, are produced by the presence of an inert, and (except a sort of pulsation, caused by contraction and expansion) motionless jelly, which dissolves even while he is examining it. The two last-named species are found in great abundance from the Azores to the Cape de Verds, and perhaps, along the whole extent of coast south of those islands; but this last I have had no opportunities of ascertaining. There are as has been shown, many varieties of the *medusa* enumerated as possessing the property of lumination. I shall however, confine myself to a notice of some of the most remarkable which inhabit our own seas. The most common of these

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are the *Medusa pellucens* of Sir Joseph Banks, one of the varieties of which is frequently met with in Boston harbor, and is doubtless well known to the younger portion of my readers by the name of sunfish,—and the *Medusa noctiluca* of Forskal, which is about three inches in diameter, and in figure like a mushroom. These last are found in great numbers about the banks which border our coasts, and their presence may be regarded as an indication of the approach to soundings. They are of a brownish color, and have tentacula like the *M. pellucens*, but thicker and shorter. Their margin is fringed in the same manner to the depth of about three eighths of an inch, and, together with the rays or ribs, resembles a wheel of light, which enlarges or diminishes as the animal contracts or expands itself. Their mode of propelling themselves, like that of the *M. pellucens*, is familiar to all who have observed the motion of the variety seen about our wharves in the summer season. The former of these, the *M. pellucens*, is of an hemispherical form, and ordinarily about five inches in diameter, and the summit of the crown is marked by a circle about an inch and a half in diameter; this is divided into six equal compartments by the intersection of three dark lines; and from the circumference of this circle to the margin of the animal, proceed a great number of radiations of a purple or brown shade. The border is fringed by a small thread-like membrane in the form of scallops, not unlike the gills of fishes, and perhaps answering a similar purpose. From this depend a great number of long tentacula, or feelers, which probably serve the purpose of securing their prey, by entangling it in their folds. From the centre of the interior is suspended a kind of bag, terminating in four or five finger-like points, which appear to be the stomach and viscera. The lustre proceeds chiefly from the crown and margin.

This creature's light is extremely brilliant, and the flashes are frequently so vivid as painfully to affect the eyes of one who looks at them for any length of time steadily. I have known the water to be so filled with them on our coasts, after the prevalence of an easterly storm, that it was dangerous to run for the land in the

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night, owing to the difficulty of distinguishing the lights on the shore, from those in the water which were flashing round us in every direction. At another time, in a heavy gale from the N. E., in lat. 35°, between the Gulf-stream and soundings, I witnessed one of the most magnificent, yet awful scenes, that can be imagined. The night was very dark, with frequent lightning in the western quarter, but until about eleven o'clock, nothing unusual was observable in the appearance of the sea. About that time it began to grow luminous, and by midnight the spectacle was sublime beyond description. The graphic metaphor of Napoleon, in his account of the conflagration of Moscow, might be literally applied to the scene before us, without fear of exaggeration. It was indeed 'an ocean of flame.' The lightning appeared to mingle with, and career along a waste of fire; and each successive shower of spray enveloped hull and cordage and canvass in a sheet of lurid light. The extremities of the spars were glittering with luminous points, and the plies of the rigging were gemmed in the same manner: as these were driven from one place to another by the wind, they presented the appearance of sparks from a forge. The effect of the light on the countenance was unpleasant in the extreme, and even appalling. The faces of the crew had a distorted and unnatural air, and wore a green and ghastly look, similar to that sometimes produced on the stage in incantation scenes. The whole left an impression on my mind which will never be effaced. During the prevalence of these phenomena the wind hauled to S. E.; in this quarter it remained about an hour, during which time the light was more vivid than at any other period of its continuance. By straining some of the water carefully through a fine cloth, I obtained a great number of small globules of a bluish color, and the water was left lustreless. These globules were in general not larger than a pin's head; a few of them were about the size of a small pea, and of an oblong figure. It is probable that these were the variety spoken of by Mr. Macartney as the *Medusa scintillans*, as they were like those he describes, so transparent as scarcely to be perceived in the water, and

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when held to the light they appeared like small drops of that fluid. They also manifested a disposition to collect together on the surface, where they assumed a pale yellow color. Upon replacing a number of those on the cloth in their native element, no light was visible while it was tranquil, but on agitating the vessel which contained them, a brief, bright flash was thrown out, in consequence of so many of the insects shining at the same instant, resembling the faint lightning of summer evenings. Besides these and several larger medusæ, there were numbers of the small shrimp, *Cancer fulgens*, which gave a very brilliant light, throwing out the flashes apparently at pleasure, and especially when suddenly disturbed. On rubbing these insects to pieces on the cloth, its appearance was similar to the phosphorescence produced by decaying fish; this, however, endured but a very short time.

At about two o'clock in the morning the wind suddenly veered to the N. W., and in a brief space, nearly all the luminous particles had vanished. Whether this sudden disappearance was owing to the change in the atmosphere, or to some other cause, I cannot pretend to determine; but I have subsequently observed, that in every instance, where the sea was more than usually filled with these particles, the wind was in the eastern quarter.

Similar appearances have been recorded by a number of scientific travellers. M. de Riville, a member of the French Academy of Science, observed the sea during a night on the coast of Malabar, to assume the appearance of a field of snow. Cook and De la Perouse, also, in the course of their voyages, mention its becoming a bright straw-color at times. Pére Bourzes, a Roman clergyman, in his voyage to India, so long since as 1704, witnessed what he termed luminous vortices, which he states appeared and vanished at intervals, like flashes of lightning. Capt Horsburg informed Sir Joseph Banks, that there was a peculiar phenomenon visible in the Indian Ocean in the rainy season. One night, when the sea was very dark, it suddenly changed to a bright flame-color, which continued about ten minutes. It bore no resemblance to the ordinary sparkling or glowing appearance, but was an equally dif-

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fused milky light. The cause of this seems to be satisfactorily given in some remarks communicated by a gentleman to Mr. Macartney. Between New Holland and the coast of China, shortly after sunset, every person on board was surprised at the milky appearance of the sea. It was imagined that they were upon a reef, and that the light was caused by the coral bottom. Upon sounding however, no bottom was found with seventy fathoms of line. This gentleman examined a bucket of water in the dark, and detected the presence of a great quantity of globular bodies about the size of a pin's head, joined together, and emitting a pale phosphoric light. These were so transparent that they could hardly be discerned when taken in the hand into the light. This singular appearance was visible for two evenings. So soon as the moon rose, the sea resumed its usual dark appearance. These remarks are extremely important, as tending to prove that the diffused light of the ocean is caused by the concourse of a vast number of minute medusæ near the surface. These globules were undoubtedly to be referred to the variety *Medusa scintillans*, or sparkling medusa.

There is another singular phenomenon, which may be traced to the same source, which has long been a fruitful subject for the superstitious terrors of the ignorant. There are few seamen probably, who have not felt a thrill of awe, an undefinable sensation of mingled fear and wonder, on beholding during the violence of a tempest, a pale, lambent flame hovering about the summit of the mast, or the extremities of the loftiest yards. This sensation is felt by almost every nation; and each has some legend of its portent, from the volatile Frenchman, who shrugs his shoulders, in helplessness, at sight of the 'Feu Saint Elme,' or St. Elmo's torch, and the timid Portuguese or Spaniard, who devoutly crosses himself and repeats his Ave, when the 'Corpo Santo' or holy shape appears, to the hardy American or English sailor, who cries out, 'Here comes one of these infernal compo-sants.' Innumerable are the tales of disaster and wreck and death, with which its presence is commented upon, and of which, to their excited imaginations, it is the too certain harbin-

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ger. Many a fearful glance is cast aloft, and many a prayer is breathed, that nothing may occur to render their presence there necessary. Men who quailed not from the fiercest fury of the storm, and whose cheeks no certain danger could blanch, have felt their heart suddenly grow faint, and their courage fail, at the sight of this dreaded object. What a benefit would a person confer on these men, who should convince them that in the calm still evenings, they had often with delighted eyes watched this same object floating by in its native element, clothed in light and beauty; and that it was merely the time and place which made it fearful. It is in fact, nothing but one of the medusa tribe, which has been blown from the top of some wave, and driven along by the gale till it encountered some obstacle in its progress, to which its numerous long feelers cause it to adhere. It is to be regretted in this as in many other cases, that those whose information is superior to the generality, should consider it beneath their dignity, or at least, unworthy their trouble, to dispel the false notions and combat the prejudices of the seaman; forgetting that whatever makes men wiser, generally speaking also makes them better. If the few brief and hasty observations here presented should prove the means of removing the shadows of error or superstition from but one single mind, the writer will have much more than received 'his reward.' The remarks in this article have been made, not without the hope of inducing some abler and better qualified hand to take up the pen, and describe as fully as they deserve, the wonders of 'the great and wide sea, wherein are things creeping innumerable, both small and great beasts.'

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[Furnished for the Tracts and Lyceum.]

THE CAUSES OF THE PROSPERITY OF ROME.

Common histories do not develope the real causes of a nation's strength and prosperity. They are occupied too much with the recital of remarkable transactions, as the march of armies, the exploits of generals, the conquest or loss of provinces, and the great effusion of human blood. But conquest alone does not make a nation great. A general does not exalt his country by his skill and valor. There must be other causes beside the success of arms, to give a people prosperity. If we should inquire what has raised England to its present greatness, we should find that it was the genius of such men as Brindley, Watt, Wedgewood, Arkwright and Davy. Canals, steam-engines, potteries, cotton-mills, safety-lamps and similar improvements have done more for England than famous victories.

It could not be military valor *alone* which maintained Rome for many centuries in her proud elevation as mistress of the world; yet history describes only her achievements in arms. It is proposed in this article, briefly to examine the causes which gave Rome her power, and which, for ages, bound remote provinces together under her sway.

One cause of Roman prosperity was the portion of republicanism in the state. In some monarchies, the people exist only for the prince, and they have no interest, therefore, in the existence of the state. Their welfare is not studied, but only his greatness. The resources of the nation are not employed in any works of public utility, but only in such as augment the glory, and administer to the pleasure of the monarch. Such were the useless monuments of Egypt, and the palaces of the eastern empires. But in Rome, there was a numerous body of citizens, not only in the capital, but over Italy and the provinces, and the accommodation of these was to be studied. Hence, stupendous temples, palaces, pyramids and mausolea were not reared, but aqueducts were made, and roads were formed. The republicanism of Rome also secured the administration of law to some extent,

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while, in despotic countries, the prince and his officers ruled without law, and the subjects had no protection but in the caprice of their rulers.

The extensive public improvements were another element of Roman greatness. 'The public ways,' says Dr. Adam, 'were perhaps the greatest of all the Roman works, made with amazing labor and expense, extending to the utmost limits of the empire, from the pillars of Hercules to the Euphrates, and to the southern confines of Egypt.' I do not wonder so much at Roman valor and success, as at the grandeur of mind that could plan and execute such roads. I do not know where the example was found, to teach the Romans to construct such magnificent and useful works. They did not find such an example in the eastern empires, nor in Greece; and, indeed, it is a striking fact, that there was not a mile of road for a carriage in all Peloponnesus, till the French constructed a short road for the transportation of their artillery, when they came to aid in the expulsion of Ibrahim a few years since. The facility with which the Romans could pass from one part of their empire to another, helped them to keep distant provinces under one government. So admirably were these roads made, that they stood firm for ages. The Appian way, which extended from Rome to Brundusium, on the way to Greece and Asia, about 350 miles, was paved with the hardest flint, so firmly, that in several places it remains entire to this day, above 2000 years since its construction. I know of no improvement like this, in any other ancient empire; and even modern nations fall far short of Roman greatness in this particular, when we take into view the imperfect state of the arts, in the days of Rome's growth. We do not look at Rome, as we look at Greece, and admire her temples; at Egypt, and wonder at her pyramids; at the east, and stand astonished at its works of superstition. We look at Rome, and are struck at the magnificence of her roads, and bridges, and distant colonies, and camps, that were designed to make of widely separated countries, one solid empire.

Another cause of the prosperity of Rome was the wisdom by which the city and its neighborhood was

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made the centre of the world for enjoyment, for wealth, and the exercise of power. A distinct empire could not be set up in any other part of the world, by Roman generals and statesmen, for this would be only to exile themselves; for Rome was their home, and no other place on earth could compare with this. Here were the men of wealth, here was learning, here the luxuries of the world might be enjoyed altogether, and here were collected the renowned men of the earth. The accommodations of Rome had a mighty influence in keeping the empire together; and when the government was removed from this city to Constantinople, not only did the city of Rome decline, but the empire itself began to decay. Much was done to give Rome pre-eminence over other cities. Nebuchadnezzar laid out immense wealth upon Babylon; and his hanging gardens were stupendous works. But these only gratified his pride, and did not recommend Babylon as a residence for private persons. The great works of Rome were of public utility, and helped to make the city the most desirable place of residence on the globe. Such were the aqueducts. 'Some of these brought water to Rome,' says Dr. Adam, 'from a distance of more than sixty miles, through rocks and mountains, and over vallies, supported on arches, in some places above 109 feet high, one row being placed above another.' In the vicinity of Rome were many beautiful villas or country seats, the sites of which were chosen with great taste. Here the wealth of all the provinces was brought, and there was much navigation to Italy, not to barter in commerce, but to bring revenue and rents from the provinces. Rome was to the empire what England is to all its dependencies. There is no danger that Englishmen will erect, at present, independent monarchies in the West Indies, in South Africa, or in India. England is their home; and if they gain wealth in India, they cannot enjoy it at Calcutta, or Bombay; but England is the land of art, and refinement, and convenience; the land of friends and great men; of picturesque beauty, and of noble institutions, where they wish to enjoy the decline of life. Such was Rome and its vicinity to the prosperous

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citizens scattered over its wide dominions. There could be no inducement to break away from a spot of such attractions, and the empire would remain a consolidated whole.

But nothing could resist the ruinous influence of vice. Rome became luxurious, proud, tyrannical and profligate, and her decline commenced. Enemies crowded in upon her frontiers, and there was not principle enough at the centre to produce vigorous action at the extremities. Constantinople divided with Rome the attractions of wealth and power, while other rich capitals sprung up, and Rome decayed, until religion again gave it ascendancy, but not such as it once possessed.

The lessons which Roman history gives us, are not so much that a nation is made great by arms, but rather by a grand system of internal improvement, connecting together the different parts of a country, and making union important to the whole. It teaches us that the public good must be studied, and not pomp, or the aggrandizement of one or of a few; that the interest of the people must be sought by the administration of law, and the prosecution of works of public utility; and that vice will overthrow the best constructed government, and a nation of the highest natural advantages. Thus history may teach lessons, not to the soldier merely, but to the statesman, the economist and the moralist; and it may show that a nation is not exalted by the warrior, but by the peaceful inventor of public improvements, the man of general benevolence, and the advocate of morality and sound religion. F. F.

FRUIT TREES.

It is presumable that the chesnut always grew in Italy, and the cherry in France; but different kinds, on account of their superior excellence arising from cultivation, were imported by the ancient Romans. Wherever their arms extended, they availed themselves of the choice fruits of the conquered countries, and the great generals who

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brought them to Rome took pride in giving them their own names, as in memory of some great service or pleasure they had done their country; so that not only laws and battles, but several sorts of apples or *mala*, and of pears, were called Manlian and Claudian, Pompeian and Tiberian, and by several other such noble names. Thus, in process of time, the inhabitants of Italy, who formerly lived on acorns, made the whole world tributary to their subsistence, as well as to their glory. Humboldt, in his Account of New Spain, (vol. 2.) says that the *Prunus avium*, or wild cherry, is indigenous in Germany and France, and has existed from the most remote antiquity in their forests, like the robur and the linden tree; while other species of cherry-trees, which are considered as varieties, become permanent, and of which the fruits are more savoury than the *Prunus avium*, have come to those countries through the Romans from Asia Minor, and particularly from the kingdom of Pontus.

Turnips and carrots are considered indigenous roots of France, our cauliflowers came from Cyprus, our artichokes from Sicily, lettuce from Cos, and shallots, or eschallots, from Ascalon. The art of gardening was introduced into England from the Continent about 1509, prior to which, most of the present produce of kitchen gardens was imported from the Netherlands.

ANTIQUITIES OF BAMIYAN.

Bamiyan or Bamian, is a city placed in the centre of Paripamisus, a branch of mount Caucasus, in that part of Independent Tartary called Great Bucharia. In Sanscrit it is called Vami-nagari, Vami-gram, and, in a derivative form, Vami-yan, 'the most beautiful and excellent city.' It is a place of great antiquity, and at a very early period, was regarded as the metropolis of the sect of Buddha. It was therefore emphatically styled Buddha-Bamiyan; but this venerable title has been perverted by the malicious mussulmen into But-Bamiyan or Bamian, 'of the evil spirit.'

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This celebrated city, the Thebes of the east, is represented in the books of the Bauddhits, as the source of purity and holiness. They pretend that it was built by the patriarch Shem, from whom it is sometimes called Sham-Bamiyan. This patriarch they suppose to have been an incarnation of Jina or Vishnu; an opinion which likewise prevails among the Bramins.

Bamiyan is situated between Bahlac and Cabul, from the latter of which it is distant eight *manzils* or days' journey. Like Thebes in Egypt, it is entirely cut out of an insulated mountain; and the surrounding valley is called in the language of the country, the Tagavi, or district of Bamiyan. About two miles south from this place are the ruins of an ancient city called Gulghuleh, which, at a remote period, was desolated by the furious zeal of the Mussulmen. The ruins of some buildings of masonry are still seen round a small conical hill in the neighborhood, whose summit is crowned with the ruined palace of its ancient kings. Through the ruins of Gulghuleh, and the district of Bamiyan, flows a pleasant, though scanty stream, which rises in the adjacent hills, and falls into a lake, from which issue four rivers, the Hirmend, the Landhi Sindh, the rivers of Bahlac, and of Conduz.

The city of Bamiyan consists of a great number of apartments and recesses cut out of the rock; and from the Ayeen Akberry, as well as from the concurring reports of travellers, we learn, that there are about 12,000 of these recesses in the Tagavi of Bamiyan. Some of these appear, from their extraordinary dimensions, to have been designed for temples. None of them have pillars, but some are adorned with niches and carved work; and fragments still remain of figures in relievo, which have been miserably mutilated and defaced by the Mussulmen. The walls, too, have been decorated with paintings, the colors of which gleam, here and there, through the smoke with which they have been in general obscured by the fires of the inhabitants. These recesses are called by the natives Samach'h, and by the Persians Samaj. They are very frequent in the country of the Afghans; some of

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them extremely rude, but others highly finished and beautifully decorated. The most perfect are at Mohi, on the road between Bamiyan and Bahlac, in which the paintings retain their original freshness, as their situation amongst precipices has prevented the Mussulmen from making them their habitations.

But no curiosities in Bamiyan or its vicinity are more calculated to attract attention, than two colossal statues seen at a great distance, which are at least fifty cubits high. They adhere to the mountain out of which they are cut, and stand erect in a sort of niches, the depth of which is equal to the thickness of the statue. At a small distance from these stands another statue of less colossal size, being only about fifteen cubits high. Concerning the names or sex of these statues, oriental writers are not agreed. The few Hindus resident in these countries say, that they represent Bhim and his consort; while the followers of Buddha maintain, that they are the statues of Shahama, and his disciple Salsala. The Mussulmen, on their part, contend, that they are the effigies of Key-Umursh and his consort, that is to say, Adam and Eve; and that the third represents Selish or Seth, their son, whose tomb, or at least the place where it stood, is shown near Bahlac. As the Mussulman troops never pass that way without firing a few shots of cannon at them, one of the legs of the male figure is much broken. It is said that Aureng-zebe passing that way in his expedition to Balhac, in the year 1646, ordered a few shots to be fired as usual. One of them took effect, and almost broke the leg of the statue, which bled profusely. Some frightful dreams conspired with this prodigy, to make him desist from the sacrilegious attack, and the clotted blood, we are told, adheres to the wound to this day. This miracle is equally credited by Hindus and Mussulmen; the former ascribing it to the interposition of the Supreme Being, and the latter imputing it to witchcraft. Between the legs of the largest figure there is a door leading into a most spacious temple, at the entrance of which are stationed a few wretched Banians who sell provisions to travellers.

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Bamiyan and Bahlac are constantly confounded by Persian authors, who call the first Balk-Bamiyan, and the second Balk-Bohhara. These authors suppose it to have existed before the flood; but the Buddhaists maintain that it was founded by a most religious man named Shama, (the same with the patriarch Shem,) and that his posterity lived there for many generations. They add, that Balk-Bamiyan was originally Abraham's place of abode; that patriarch, according to scripture, and the sacred books of the Hindus, having removed with his father to distant countries in the west. Diodorus Siculus informs us, that it existed before the time of Ninus; but he, like the Persian writers, has mistaken this city for Bahlac. By the natives, Bamiyan and the adjacent countries are regarded as the abode of the progenitors of the human race. Here, too, the first heroes of Persian story lived and performed innumerable exploits; here their holy instructors first delivered their precepts; and here was the site of the first temples that were ever reared.

Bamiyan fell into the hands of the Musulmen at a very early period of their history. At one time it was governed by kings; but this dynasty, after continuing but a few years, terminated in 1215. Gulghuleh, the royal residence, called then the palace of Bamian, was destroyed by Zengis Khan, whose resentment against the inhabitants was so violent, that he massacred them without distinction of age or sex, and even vented his fury against the brutes and trees. The natives of that country gave it then the name of Gulghuleh, signifying, 'cries of woe.' As it would have been ominous to rebuild it, they erected in its stead a fort, on a hill to the north of Bamians, which still bears the name of Imperial Fort. This castle also was destroyed by Zingis the Ushak, in 1628, and has never since been rebuilt.

The district of Bamiyan is now barren, and without a single tree; yet the sacred books of the Hindus, and of the Bauddhists, positively affirm, that of old it was fertile. There is a tradition, too, that at one period it was so overstocked with inhabitants, that trees, underwood, grass and plants, were all completely destroyed. The vegetable

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soil, thus deprived of cultivation, was, in the course of ages, washed away by the rains; and indeed the soil in the valley is extremely rich, and the whole district as it now is, a most delightful spot. The vine, and almost all the fruit trees we have in Europe, grow spontaneously and to high perfection in the country to the eastward of Bamiyan, as far as the river Indus. The natives, when they find a vine or any fruit tree in the forests, clear away all the wood about it, and dig the ground, which brings the fruit to perfect maturity. Bamiyan seems to be the Drastoca of Ptolemy, that name being derived from the Sanscrit Drashatca, which signifies 'the stone city:' for before that time towns were nothing more than a mere assemblage of huts. The distance and bearing of Drastoca from Cabura, or Orthospana, leaves no doubt that it was the same city as Bamiyan.

LETTERS FROM THE CANARY ISLANDS.

BY D. J. BROWNE.

Our readers will recollect that some weeks since, a letter from Mr. Browne was published in this Journal, and an intimation given that others would follow. Unexpectedly, however, Mr. Browne returned to this country much sooner than he anticipated, and has very recently published a digest of his travels, in a small duodecimo, which he has politely dedicated to those friends who kindly interested themselves in the objects of his research. Mr. Browne has established a reputation for industry and close research; and this little volume, from which the following extract has been made, shows that his scientific acquirements, and accurate investigation, give him a claim on men of understanding everywhere. It will be regarded as a curious fact, that valuable and interesting as these letters must be to all classes of readers, he has printed only *seventy-five copies*, which completely forbids its circulation beyond the immediate circle of those personal friends to whom it is dedicated.

The measurement of the Peak of Teneriffe has occupied the attention of various individuals at different periods,

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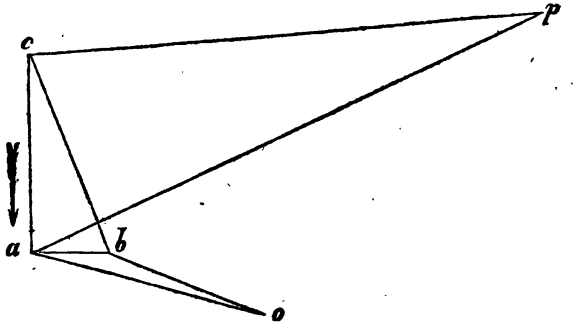
whose efforts have been attended with the widest results; and the obscure manner in which most of their operations have been brought before the public has prevented us from judging of their error or truth. Consequently, my attention has been occupied for several days past in performing that task trigonometrically, not, however, as an object of mere curiosity, but as being essentially connected with my physical labors.

The ground in the Valley of Orotava being uneven and intersected by ravines, it was impossible to find a base extensive enough to determine the distance of the Peak by a single triangle, consequently I employed two. I measured on the plain between the Botanic Garden and La Paz, my first basis *a b* of 100 toises, or 639 English feet. See the following figure.



By means of this, I calculated a second *a c* of 1430·06 toises, and afterwards a third *a p* of 9953·4 toises, which was the first grand base required. The point *c* was in Mr. Cologan's garden in La Villa de la Orotava, near the great dragon-tree spoken of in a former letter; and the point *p* was the summit of the Peak. The base *a b* was measured by Mr. Hurst of London, and myself, on three occasions, each of the measurements terminating with nearly the same results. The following were the angles of the two triangles taken with minute attention.

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Triangle *a b c.*		Triangle *a c p.*	
Angle *a b c* =	86° 00′	Angle *a c p* =	119° 58′
" *a c b* =	4 00	" *a p c* =	7 13
" *b a c* =	90 00	" *c a p* =	52 49

At the point *a*, the Peak subtended an angle of 10° 35′, by means of which, I found that its summit is elevated 1859·73 toises above the point *a*.

My next object was to determine the height of the point *a* above the ocean. In order to do this, I employed the same basis *a b* of 100 toises as in the preceding triangle, from which I calculated another *a o* of 1339·46 toises, which was the second grand base required. The point *o* was a vessel riding at anchor in the quarantine of this port. The following were the angles of the triangle *a b o*, taken in the same manner as those of the other triangles.

Angle *a b o* =	137° 58′
" *a o b* =	2 55
" *b a o* =	39 07

The angle of depression from the point *a* to the point *o*, was 19° 49′, and of course, the angle of elevation from the point *o* to the point *a*, was the same. From these data, I ascertained that the point *a* was elevated 48.26 toises above the ocean. The height of the eye above the point *a*, in taking the angles of elevation and depression, was 1·5 toises; and the state of the atmosphere at the time that the angles were taken, was perfectly serene, on account of which, I only deducted, for the effect of refraction, 2·34 toises. Hence we may infer from the foregoing operations, that the absolute height of the Peak of Teneriffe, above the level of the ocean, is 1905·65 toises,* or 12,177 English feet.

From the action of the elements, and the numerous lateral eruptions to which this mountain has been subject these last two centuries, its elevation has been considerably diminished. I am informed that the appearance of its

* My first basis was divided into toises of 6·39 English feet each, and of course, all the distances calculated from it, were of the same proportion; but more accurately the French toise contains 6·3957 feet; hence the Peak has an elevation of about 1904 toises.

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summit was sensibly altered after the deluge of 1826, and to compare the present outline of its summit with the ancient drawings of it, there is but a very faint resemblance.

It has been asserted, that volcanoes always increase in height, until they are extinguished, when they begin to fall, and, by degrees, sink into the caverns below. This, undoubtedly, has been the case in the present instance, the lateral eruptions having exhausted a great quantity of the bowels of the mountain, and the portions above, being too heavy for their hollow foundations, have given way and settled down into the mountain. Some are of an opinion, however, that the crater of this volcano has never been totally extinguished, and that another grand eruption is approaching, from the fact that a hot vapor issues from its nostrils, which is said to have gradually increased in temperature within these last thirty years. This may be the case, but it is a matter of uncertainty; for the first time that I visited this volcano, the vapor had a temperature of more than 220°, and about two weeks afterwards, I found that it had a temperature of only 160°; but one of the probable causes of this change was, that the summit of the mountain existed under very different circumstances, at one time a tremendous hurricane, and the other, scarcely a breath of wind.

For many evenings past, my attention has been particularly arrested by an extraordinary brilliancy of the zodiacal light, and the sudden departure of the twilight. The former is a beautiful phenomenon, constantly existing at the equator, and presents itself just before sunrise or after sunset, under the appearance of a serene whitish clearness, resembling the galaxy. It has the form of a pyramid, with its base turned towards the sun, and its axis in the zodiac. As we approach the poles, it appears towards the end of winter, and in the spring, after sunset; and in autumn, or the beginning of winter, we observe it before sunrise. Many theories have been advanced with regard to its cause, but none of them satisfactory; it must be referred, however, either to the nature of the terrestrial atmosphere, or to the position of the globe with its relation to the sun. The delightful spectacle of the dawn and of twilight, is

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almost entirely denied to those who live in the regions of the equator, where the sun rises in a direction nearly vertical; the light or darkness comes on very near the time that the sun approaches or recedes from the horizon. It is towards the poles that these reflected splendors are the longest visible. As we pass northward, or southward from the equator, they become brighter and brighter, until they change the whole of the night into a magic day.

Early on the morning of the 26th of September, I pursued my way nearly a league, at the northward, to El Baranco de Herque, where I visited one of the sepulchral caverns of the Guanches. It is entered by two comparatively small openings of the rocks, leading to a large, dark and gloomy vault, formed by nature, which formerly contained an immense number of mummies.

The history of the antiques of these islands is involved in great obscurity, and their existence is best proved by the remains of their dead; for their posterity is nearly, if not entirely extinct. "The manner of embalming their dead is not explicitly illustrated, but apparently the brain and intestines were completely removed, after which it is said the body was washed with an infusion of pine bark. Next, it was anointed with butter or warm grease, which had been boiled with such penetrating and odoriferous herbs as were peculiar to the islands, and then it was exposed to the sun. Being well dried, the same operations were re-

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peated, and also subsequent drying, until the body was completely impregnated with the aromatic unguent. When reduced to very inconsiderable weight, the process was deemed complete, and the deceased was wrapped in an envelope, consisting of three successive layers of bandages of tanned goat-skin, about three inches broad." Bodies thus embalmed were carried to caves in the mountains, and then placed upright in niches, or laid out on square tables of stone. They appear to have selected for this purpose, the most precipitous and inaccessible places that they could find, many of which exist on the islands where man dares not enter his foot.

I visited several other caverns in the vicinity of this baranco, which contained immense quantities of bones that had not been embalmed. Many of them were in a fine state of preservation, but they were thrown together in so confused a manner that an entire skeleton could not be obtained. I had an opportunity, however, of comparing the crania with those of the aborigines of the other islands, and found a striking similarity to exist among them, proving in a degree that they all originated from the same race. But we are informed that the natives of some of these islands were unknown to those of others, and that the natives of one island had but very little intercourse with those of another at any rate.

In reviewing the vocabularies of the languages of the antiques of these islands, I find a wide difference to exist among them. However, those of Lanzarote and Fuerteventura very nearly agree, and also that of Hierro nearly coincides with that of Gomera, but the others, with the exception of a few words, have not the least analogy. The word *ganigo*, a kind of earthen ware, signified the same on all the islands but Palma; and the word *gofio* was common to all the islands except Teneriffe, Hierro and Gomera. These two words are used throughout all the islands by the lower classes of the natives at the present day, and have the same signification as formerly.

It was formerly supposed that the languages of the aborigines of these islands had no analogy with the living tongues; but since Africa has been more thoroughly in-

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vestigated it is found that several words have common roots with words of the Chilha and Gebali dialects. For example I will cite a few words:—

Heaven, (in *Palma*,)	Tigotan.	(in *Berberic*,)	Tigot.
Milk, (in *Fuertoventura*,)	Aho.	"	Acho.
Barley, *do.*	Temesen.	"	Tomzeen.
Basket, (in *Canary*,)	Carianas.	"	Carian.
Water, (in *Hierro*,)	Aenum.	"	Anan.

It is doubted whether this analogy is a proof of a common origin; but it indicates the ancient connexion between the Guanches and Berbers, a tribe of mountaineers with whom the Numidians, the Getuli, and the Garamanti are confounded, and who extend themselves from the eastern extremity of Atlas by Harutsch and Fezzan, as far as the oasis of Siwah and Augela.*

About eight o'clock I returned to Candelaria, which takes its name from the miraculous appearance of *Nuestra Señora de la Candelaria* at this place, in 1392. She was picked up on the beach and placed in the chapel, and was believed, by the natives, to be the real Virgin Mary. They looked upon her with profound veneration, and loaded her shrine with many valuable offerings. She remained in that situation until the 8th of November, 1826, when she, with the chapel, was swept away by an awful hurricane and deluge, and has not yet performed the miracle of returning, though many less feasible ones are attributed to her by her devotees. She consisted of a small, black image bedecked with jewels and other trappings, and in fact was nothing more than the figure-head of a vessel, which washed up in that place.

* Vide Adelung und Vater, Mithridates, t. iii. p. 60.

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ORIGINAL MISCELLANY.

THE FIRE-KING.—A certain itinerant, who cognominates himself DR. DIVINE, who, for aught we know, may have something to do with what Livy terms *putavinity*, has recently been cooking beef-steaks in this city, putting a stick of hot sealing wax in his capacious mouth, cooling melted lead on his tongue, and between the acts, discoursing most profound nonsense to those who were wonderstruck at his salamander-like excursions into a huge brick box, termed, by way of eminence, an oven. We went, as many others did, to witness an extraordinary exhibition, in which it would be demonstrated to a moral certainty, that the discoveries of modern science had actually enabled a man to triumph over the devouring element of fire. But the disappointment was indeed a grievous one, when, instead of hearing common sense in good vernacular English, our ears were assailed by the low and vulgar trash of *Jim Crow*. Certainly, the whole exhibition, *dr.* and all, was below the notice of a gentleman, and we now distinctly warn all future patrons of this American salamander, not to believe that he is aided by the devil, who would never have anything to do with such a *divine*, nor for one moment to indulge the idea that he is prodigiously learned in the occult or other sciences.

EXTRAORDINARY POWER OF MEMORY.—Seneca is reported to have been able to repeat two thousand verses at once, in their exact order, and then rehearse them backwards, with so much precision as not to miss a single word or syllable. Cyrus had a memory so exceedingly tenacious, that historians say he could call every soldier in his immense armies accurately by name. Mithridates, who was the ruler of twenty-three nations, speaking different languages, could converse with all of them in their vernacular tongue. A Corsican boy could rehearse forty thousand words, whether sense or nonsense, as they were dictated, and afterwards begin with the last word, and repeat them backwards without a single mistake. Dr. Wallis extracted the cube root of *three*, even to thirty places of decimals, solely by his memory. Maglia Bethi, an Italian, who read most of the books written in his lifetime, could tell what was the subject of each author, quote the chapters, sec-

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tions and pages in which any particular subject was expressed; beside this, he could repeat even the writer's own words. A gentleman loaned him a manuscript to examine, and afterwards pretended he had lost it, when, to his utter amazement, Bethi wrote it word for word, by the mere strength of his memory, although he read the article but once. Euler lost his sight in 1783, yet carried on his complicated and abstruse mathematical calculations on the inequalities of the planetary motions, and composed a treatise on algebra, by dint of his astonishing memory. He could, moreover, repeat the Æneid of Virgil from beginning to end, and tell the first and last line of every page in the edition which he had read before he became blind. Whitfield is said to have been so familiar with the scripture, that he could repeat the whole bible without mistake. A physician who died a few years since, in Massachusetts, could repeat the Paradise Lost of Milton in his old age, though he had not read it for twenty years.

Stars.—Many stars which were marked by the ancients in their catalogues are no longer seen, but others are visible which were unknown to them. While a very few seem to have receded, others have gradually increased in brilliancy. Some astronomers are of the opinion that the whole of our solar system is moving onward towards the constellation Hercules. If this be true, then it is very certain that the class of magnificent worlds, to which this globe belongs, are revolving, in an orderly manner, round some great central point of attraction, of which the human eye has never had a view. In the course of the last 150 years, some of the fixed stars appear to have moved. The star Arcturus has moved three minutes and three seconds, in seventy-eight years. No fact has been more satisfactorily demonstrated, than that the law of gravity operates, positively, from the sun to the planet Herschel, *eighteen hundred millions of miles*, and it is therefore probable, that all the heavenly bodies which are discoverable with telescopes of the greatest power, are in subjection to some vast, inconceivably vast central globe, self-balanced somewhere in celestial space; and that may be the resplendent throne of God.

Latin Works.—A collection of standard Latin works is now being published at Turin, by Pomba. In 1832, ninety-six volumes were completed.

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RAT-CATCHING.—Formerly, rat-catching in England, was a profitable business, and even now, is by no means a starving trade. The mode of conducting the process is this:—Having bargained with the owner of the premises, as it respects the number of rats to be captured, and the price per head, the operator props open the mouth of a bag, by what is called a *figure four*, which he controls with a string. All the doors being opened, the rats and mice rush towards the sack, from every point of compass, as though driven onward by some irresistible force. If the number is sufficient, the string is jerked, the figure four falls, and the wonder-working man goes leisurely to a tub, and drowns them all together.

Now the inquiry naturally arises, what determines these shy, timid animals to leave their hiding places at the first invitation, and by what power are they collected in the bag? In answer, it is said, that on a bit of hard crust is dropped a little oil of *rhodion* and *anise*, which give off such a fascinating odor, that, regardless of every danger, they make a simultaneous movement towards the seducing treasure, at the hazard of their lives.

CHARACTERISTIC FASHIONS.—The *Omaguas* of South America flatten their children's faces by closely lacing a board on either side of the head. They also pierce the nostrils, lips and cheeks, in order to insert feathers or fish-bones, as ornamental appendages. Formerly, nearly all the inhabitants of the Friendly Islands cut off one, and sometimes both little fingers. In the northern parts of China, we are assured by a late traveller, the women pursue various methods in order to diminish the size of their eyes. Narrow eyes, a flat nose and long pendulous ears are the externals of beauty. The New-Hollanders extract, almost universally, the two front teeth of the upper jaw.

Sir Joseph Banks was present at the tattooing the back of a girl, thirteen years old, at Otaheite, by an instrument with twenty-four points, which were thrust all at once, so far into the skin, as to bring blood every time. She screamed most violently, so painful was the operation; but two women who were present, chid and beat the poor child to keep her still.

MILKY WAY.—Sir William Herschel says that when viewing a certain portion of the milky way, in the course of seven minutes, more than fifty thousand stars passed across the field of his telescope.

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Locusts.—Mr. Madox, in his recent travels through Egypt, says, 'April 8th, an immense host of locusts showed itself, during the last three or four days, apparently coming from the east. The number of these insects absolutely obscured the atmosphere, which otherwise was clear and serene; though the vibratory motion of their wings in the brilliant sunshine had a peculiar and rather pleasing effect. They flew heavily, and frequently struck against the houses, and falling on the ground, the fowls and dogs devoured them with much avidity, particularly the latter, who ate them so voraciously that they made themselves sick. These locusts were of the form and size of large grasshoppers, and many alighted on the neighboring grounds to deposite their eggs upon the verdure. The governor, however, most providently sent people to collect and destroy them, which was effected by burying them deep in the ground, or by burning them in heaps. I afterwards saw innumerable swarms of these insects floating on the sea, and covering the whole line of coast.'

Strength of Human Muscles.—Robert Francais Damiens, who attempted the assassination of Louis XV, in 1757, after suffering the most unheard of tortures, was sentenced to be drawn in quarters by four horses. But although they exerted their entire strength, by drawing in four directions upon his limbs, for *fifty minutes*, the muscles were not torn from their attachments; and being still alive, the executioners were obliged to cut the tendons with a knife, in order to answer the law, which was that the criminal's body should be drawn in quarters. Precisely the same course was resorted to in the case of Ravaillac, who assassinated Henry IV, the horses being unable to dismember the criminal's body.

Mental Culture; or the Means of Developing the Human Faculties.—Within a few days a volume with the foregoing title has been put into our hands, which should find a place in the parlor of every reading family. The author is J. L. Levison, and the volume is the only index we have to the author's vast fund of intellectual philosophy. It would be injustice to the ingenious writer to present our readers detached portions, and the smallness of this journal precludes the possibility of publishing the whole. Under such circumstances, therefore, we strongly recommend this highly valuable book to all persons interested in the education of youth. It is published by Allen and Ticknor, of Boston.

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RAPHAEL.—Very recently, so says a writer in the Edinburgh Phrenological Journal, the skeleton of Raphael has been examined, in the tomb which he erected for himself; and as the skull had not been detached from the bones of the neck, it is very certain that a cast has never been taken, and therefore, those which have been sold as genuine are positively spurious. We believe that several of them belong to cabinets in this country. By another account, we learn that, by an exact measurement of the skeleton, that distinguished painter was five feet and six inches high.

NAUSCOPY.—Many persons in the Mauritius possess, or pretend to have the power of discerning the approach of ships at vast distances from land, and wholly beyond the ordinary sphere of human vision. Of late, this power has been questioned, and Mr. Telfair, a gentleman of close observation, has clearly demonstrated that this pretended art of *nauscopy* is a mere chimera, which has imposed upon the very persons who pretended to have discovered it.

CHINESE LANGUAGE.—According to Sir George Staunton, there are scarcely fifteen hundred distinct sounds in this language; yet Chinese scholars make use of eight thousand characters to express all their ideas. The original object was to have the letter represent the thing; as for example, an upright mark was the picture of a man. The character expressive of happiness includes land; and moral enjoyment a row of lines representing children.

MECHANICS IN THE CITY OF CANTON.—There are supposed to be in that city, 50,000 cloth manufacturers, 7,300 barbers, 4,200 shoemakers, beside a multitude of other mechanics, amounting, according to the most accurate culculations, to 246,000 in the whole. Two thousand persons are engaged in the practice of medicine. The entire population of the city cannot be far from 1,000,000.

PHILLIP BARATIER, who died in Halle, in 1740, at the age of *five* understood the Greek, Latin, German and French languages, and at *nine*, he could translate any part of the Hebrew Scriptures into Latin,—could repeat the entire Hebrew Psalter, and at *ten*, he completed a Hebrew Lexicon of difficult words.

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HEIGHT OF MOUNTAINS.—It has been determined that the Himalaya mountains are the highest on the globe. On the borders of Thibet, one peak is 27,000 feet, which is a little more than five miles high, and visible 230 miles. In the moon, several mountains have been measured which exceed twenty miles perpendicular height.

MOSAIC.—A mosaic pavement, a great curiosity, has recently been discovered at Rome. It is eighteen palms square. The following inscription, in Greek characters, was easily read:—'*Heraclius executed the work.*'

EGYPTIAN ANTIQUITIES.—The cost of transporting the obelisk of Thebes to Paris will not be far from two millions of francs. An offer was made to convey Cleopatra's needle to England for nine thousand pounds.

JUPITER.—It has been asserted by an astronomer, that the planet Jupiter might contain within itself a *thousand* globes as large as the earth. The sun is a thousand times larger than both.

TO CORRESPONDENTS.

IN looking over the mass of papers which have accumulated since the last number was published, we are free to acknowledge our satisfaction. Certainly, there must be a goodly catalogue of well-trained writers, interested in the character and success of this publication. Heretofore, a passing notice has been given of each communication, but the very idea of making a particular acknowledgement to each contributor, to day, would be unreasonable. As fast as room can be made, such as are most appropriate will be published in turn. Thus far, owing to the industry and liberality of our correspondents, scarcely ten pages have been printed in the present series of the Scientific Tracts, that have not been purely original matter; and were this journal twice its present size, and issued once a week instead of semi-monthly, an abundance of original manuscript would be procurable.

We ask a continuance of favor from correspondents, and solicit articles on any subject to which the writer chooses to devote a leisure hour. Though we sometimes exercise the constitutional right of VETOING, it is only in extreme cases, where the rules of syntax are shockingly violated, the subject barbarously unphilosophical, or some personal abuse lurks in ambush.

☞ The communication handed in just as the proof was being corrected, on the Report of the Boston Infant School Society, must necessarily be postponed till the next number.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

JUNE 1, 1834.

PHRENOLOGY.

An Abstract of six Lectures on Phrenology, recently delivered at the Temple, by WILLIAM B. FOWLE, Esq.

A VERY interesting synopsis of these lectures having been given in the Mercantile Journal, we have availed ourselves of the principal part of what appeared there, because it was utterly impossible to prepare a condensed report, that would compare with the Editor's in point of interest. An article is in preparation on the utility of the study of Phrenology, which will be read by instructors of youth and by parents, with satisfaction.

IN the first lecture Mr. Fowle began with a fair statement of his claims as a phrenologist. He did not pretend to be more than an inquirer into the truth of a science which laid claims to the candid examination of all men, and especially of those who, in any way, guide, govern or instruct their fellow-men. He only proposed to give a plain statement of these claims, as he understood them, without any intention to contend with anti-phrenologists by research, who were few in number, or by education, who were, of course, not prepared to argue the contested points. He slightly alluded to the alarm which the new science had created in many timid and worthy minds, but he considered these apprehensions as having in a great measure subsided. He alluded to the opposition which phrenology had encountered, but seemed to think its progress had been unusually rapid. He considered phrenology as a natural science, as capable of demonstration as botany, or any other science. He took it for granted,

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that the brain was the organ by which the mind manifested itself. He did not pretend to say what the mind was, but he thought it absurd to suppose that it could act without an organ. Phrenology was based on practical anatomy, but anatomy alone could not prove or disprove phrenology. It was necessary to study the physiology of the brain also. It was by observing the coincidence between certain developements of the brain and certain peculiarities of mind, that Gall was led to discover truths which anatomy and more careful examination have since confirmed.

He then proceeded to show, by numerous drawings of the brain, that there not only was nothing in its structure opposed to phrenology, but many things to lead us to doubt whether the brain can be a single organ, as anti-phrenologists maintain. He gave an anatomical description of the formation and increase of the brain, and then of the formation of the skull, which is moulded upon the brain, and which, by means of the arteries and other vessels with which its bones are filled, is capable of enlarging as the brain is enlarged. He stated that Gall and Spurzheim, in examining the structure of the brain, pursued the opposite course to that usually followed. Instead of beginning at the top of the brain and slicing it off, and describing its mangled appearances, they began at the spinal cord, and followed up its fibres through the substance of the brain, until they terminated in the convolutions on its surface. Both modes of dissection were illustrated by large paintings. He remarked that phrenologists considered the brain as a product of the nerves, or an addition to them, and not the brain as the origin of the nerves. He then, by another series of paintings, showed the progress of the nervous system towards perfection, by a comparison of the ganglions of a caterpillar, which has a nervous system, but no brain, with the brains of a variety of animals in the different orders up to man, the brain becoming more complex as the animal became more intelligent. He alluded to the various methods which had been adopted for comparing the intellectual developement of one man with another, particularly, that of the facial angle, which he proved to be

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unsatisfactory. He showed a copy of an ancient drawing, where something like a phrenological division of the head was attempted, and he gave an amusing specimen of the unsettled state of mental philosophy, before the days of Gall and Spurzheim, concluding, as well he might, that any *attempt* to improve the science of intellect should be received with candor, and every *real discovery*, be welcomed with gratitude.

In the second lecture, after recapitulating the general views of the first, Mr. Fowle gave some further illustrations of the nervous system. He explained Dr. Bell's discovery in regard to the two classes of nerves, and their separate functions of feeling and motion. He entered more particularly into the description of the brain, described its texture, the course of its fibres, the formation of the convolutions or irregularities on its surface, the means of communication between the two hemispheres, and of course, between the several pairs of organs. He thus amply refuted the objection that if the organs are double the sensation must be so. He alluded to the optic nerves, which are known to communicate with each other before they enter the brain. Indeed, his explanation of the mode and places in which all the nerves of the senses unite with the brain, led to important inferences favorable to phrenology. Mr. F. thought 'man's proper study,' *Himself*, had been too much neglected. Dr. Gall was bewildered in his researches until he left the theories of metaphysicians, and turned his attention to the actions, anatomy, and physiology of his species. Dr. Gall did not pretend to know what the mind itself is; he could no more tell what a man had done by inspecting his brain, than an anatomist could tell what the eye had done by dissecting it: he could only judge what it was capable of doing. Some philosophers had taught that all ideas were innate, others, that they were all acquired; phrenology taught neither extreme. Mr. F. considered the unsettled language of metaphysics as a strong presumption that the truth had not been attained. Language becomes fixed when knowledge is certain. His description of their mode of applying the term *instinct* to so many various operations

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of the lower animals was amusing, and fully sustained his position.

The ancients divided the mental operations into those of the head and heart; the former being the seat of intellect, the latter, of the affections. But he contended that a large heart was no mark of benevolence, for the tiger has a very large one. It was now generally agreed, and phrenology taught, that the brain was the seat of the affections, as well as of the intellectual powers.

Mr. F. alluded to the objection that the brain, being a soft substance, could not impress its form upon solid bone. He showed that the brain was formed first, and its bony envelope was made to fit it afterwards. The skull was at first, not thicker than paper, and yielded to the growth of the brain, which he thought continued to grow as long as it was actively exercised. The different weight of the cerebellum in infants and adults he thought an irresistible argument, not only of the growth of the brain and of the skull, but of the truth of phrenology.

Mr. F. alluded to some curious information contained in the communication of a London hatter to a phrenological society. He maintained that the intellectual class of his customers wore the largest hats; masters generally wore larger hats than servants, &c. &c. But Mr. F. warned his audience not to think a large hat a sure criterion of intellectual power. The size of the hat usually depends upon the *base* of the brain, about the eyebrows and ears, and some persons measure largely here, the upper region of whose heads is small.

Mr. F. showed casts of heads taken at different periods of life, and a remarkably thick skull of an idiot. He explained the principle of absorption, by which the bones, as well as the softer parts of the animal, are continually changed, and referred to Bell and other anti-phrenologists for more particular information.

In commencing the examination of heads, he thought beginners should be satisfied with the general divisions called regions, which he explained by drawings and casts. He thus showed how a large head might be a bad one, when the bulk of the brain is in the back or sides of the

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head. M. F. next explained the nature of *Temperaments*, which exert such an influence upon the brain as well as upon other organs. He explained the three prevailing temperaments, nervous, sanguineous, and bilious or lymphatic, and described their different effects upon the brain and nervous system. He then described the mode in which Dr. Gall proceeded in discovering the faculties. Dr. G. named them from their abuses frequently, but Dr. Spurzheim corrected this error. He considered all the organs as good and useful, but liable to abuse, and he gave them names which designated the function in the abstract.

Mr. F. divided the organs into intellectual powers and feelings. The latter he subdivided into propensities and sentiments. He hinted that different intellectual powers made metaphysicians disagree, as different propensities caused the disagreement of moral philosophers. Each judged of others by himself. Mr. F. contended that the propensities were inherent in nature, and not caused by any external circumstances. Man had not mechanical skill because he had hands, for the monkey had two hands to his one; and the tiger was not carnivorous because he had certain teeth and claws.

In describing the organs, Mr. F. began with *Amativeness*, because on this the continuance of the species depends. He regretted that so little was generally known of the nature of this propensity, and, if we understood him, hinted that a lecturer who should properly explain to the young its power and its dangerous abuses, would save thousands of valuable lives to the community.

He next described *Alimentiveness*, as necessary to the preservation of the species. He showed that hunger and thirst did not proceed from the cravings of the stomach, but from a mental impulse. By various casts and paintings he explained the situation and developement of this organ in the brain and on the cranium, on the skull and on the living head. This is the only organ that was not discovered by either Dr. Gall or Dr. Spurzheim.

Mr. F. next described *Destructiveness*, or the propensity to destroy life, necessary, he thought, to the existence

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of animals that feed on flesh. He mentioned a singular proof of the location and existence of this organ drawn from comparative anatomy. He showed skulls of carnivorous and herbivorous animals, which both had the organ of alimentiveness, while the carnivorous alone had the organ of destructiveness. Mr. F. showed undoubted casts of the heads of many murderers; that of Le Blanc, the murderer of the Sayre family in Morristown, those of Raynolds and Tellar, who murdered the keeper of the Connecticut State Prison, that of Miner, who killed the constable in Rhode Island, Gibbs the pirate, &c. &c., in all of which the width from ear to ear was remarkable. These heads he contrasted with those of Hindoos, and others remarkable for lacking the destructive propensity.

Mr. F. did not confine the operations of this organ to the taking of life. He pointed out some of its abuses, and very properly censured the propensity to mutilate works of art, deface fences, &c., from which this community has so often suffered.

Philoprogenitiveness, the next organ, is almost synonymous with parental love. When mentioning its almost invariably greater developement in the female head, Mr. F. gave some directions for distinguishing the heads of the two sexes, that of the male being wider and shorter than that of the female. By various casts of the lower animals, he showed that this difference is not peculiar to man. This organ leads parents to protect their helpless offspring, a protection which is as often granted when the object is undeserving as when it is worthy. Mr. F. paid a just tribute to maternal love, and satisfactorily accounted for the hitherto unaccountable dislike men have felt for the routine of a nursery.

The last organ noticed was *Adhesiveness*, or, in other words, attachment. This organ leads, as we understood Mr. F., to every kind of attachment but that which depends upon philoprogenitiveness. Friendship, connubial love, and filial attachment, spring from this impulse. Mr. F. seemed to consider this propensity the natural origin of society; and he illustrated this opinion by the history of gregarious animals as well as of human society. This organ

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acts powerfully even in bad minds, but our limits forbid our extending this analysis farther.

In the third lecture, Mr. Fowle briefly reviewed that part of the preceding lecture, which related to the location of the organs of alimentiveness, destructiveness, amativeness, philoprogenitiveness and adhesiveness. He showed that, in his theory of the mental powers, Dr. Gall sought for what was necessary to man in his present condition. Alimentiveness was necessary to the preservation of the animal, destructiveness to self-defence and the procuring of food, amativeness to the continuance of the species, philoprogenitiveness to the education of the helpless offspring, and adhesiveness to the existence of society. He next showed that, although man was the same animal, he had local attachments which can only be accounted for by the existence of the special propensity called *Inhabitiveness.* He illustrated this position by a brief survey of the habits of the lower animals. He mentioned that the extent of this propensity was not fully ascertained, some believing, with Drs. Spurzheim and Gall, that it merely gives love of place, home, country, &c., while others think that it gives the power of concentrating the mind upon any subject, whether it be home, one's business, or any course of thought requiring abstraction. Where this organ is small, the person is prone to an itinerant life, and he showed its deficiency on the cast of Whitefield's skull, Miner's and others, in whom locality, or the disposition to travel, was not checked by inhabitiveness.

Combativeness, the next organ, was also necessary to self-defence, and the defence of our friends, children, home, rights, property, &c. The organ is useful when properly regulated, as are all the others.

This propensity is not so much cultivated as formerly, war having become a more intellectual trade. Mr. F. thought the barbarous practice must be abolished by suppressing the combative and destructive propensities, and by the cultivation of the intellect and higher sentiments. Every long period of peace helps forward the human mind, by effecting this double purpose. Mr. F. stated that the courage of horses and other animals may infallibly be

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discovered by the width of the head between or just back of the ears.

The next organ was *Secretiveness*, which restrains our emotions and desires until the judgment provides for their suppression or outward expression. This organ was essential to the formation of a prudent character, and was a powerful means of rendering all the other powers useful. Its abuse leads to lying; and it qualifies theft, though it never causes it. He enlivened the details by an account of his own experience in regard to a little negro servant, and thence took occasion to give some phrenological directions for choosing domestics, which he thought might be more safely depended on than any recommendation.

The eighth organ was *Acquisitiveness*, or the desire of getting. It was indispensable to man, and to some of the lower animals. He seemed to think the distinction of property found as irresistible support in the nature of man as did the distinction of merit. The abuse of this organ leads to theft, secretly, if combined with secretiveness, boldly, if combined with combativeness or destructiveness. Like all other propensities, this had no definite object, and followed the direction given to it by other powers. He mentioned the case of an idiot who filled his cell with the most worthless things, and took as much pleasure in surveying his hoards of useless things as misers do in surveying the treasures they never use. This organ often exists in combination with strong benevolence, and together, they form that anomalous character which is too hard at a bargain, and yet, at times, extremely generous.

The next organ was *Constructiveness*, whence arises mechanical skill, which, Mr. F. contended, does not proceed from reflection or intellectual endowment. Some of the most intellectual of the lower animals do not build as others do; some good mechanics have small intellect, and many men of large intellect have no mechanical skill. He proved, by an interesting story of the beaver, that the propensity to build may lie inactive for several generations, and then show itself when necessity required its exertion.

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He next came to the *Sentiments*, and dwelt upon the necessity of *Cautiousness*. He showed how it influenced all the propensities he had described. Excessive caution led to timidity, but Mr. F. did not allow that fear was only the absence of combativeness or courage. It was a positive impulse, and often so excessive as to produce suicide. Caution is more developed, said Mr. F., in the female than in the male of all animals. He mentioned several curious facts to prove this in the lower animals, and he seemed to think the male of our own species would not so often get into trouble, if he paid more deference to the superior cautiousness of his mate.

Next came *Approbativeness* or love of approbation. Its influence was good and necessary. Care should be taken to give it a right aim, for if led by the lower propensities, it would seek for the approbation of the vicious and abandoned. He thought human conduct greatly swayed by this sentiment. It existed, he thought, in very young children, and might be advantageously used in education. He seemed to think the denunciations of emulation were not founded in the nature of man. The sentiment could not be destroyed, and might be judiciously directed. When large, it must be suffered to repose, but when feeble, it might be encouraged.

The twelfth organ, *Self-esteem*, was also natural and necessary. Dr. Gall discovered it first in the head of a beggar too proud to work. It was evident, Mr. F. said, that the sentiment of pride did not arise from any endowment or condition, for it was found in all conditions, and in every grade of character. This organ was said to be strongest in males, and love of approbation in females. It seemed clear that our daughters are generally educated for effect, and as the organs increase in size by activity, especially in youth, it may not be difficult to account for the greater force of vanity in the female mind. Children in whom self-esteem is small are obedient, and those in whom it abounds, wilful.

Benevolence, the next organ, produces kindness of thought, word and action. Mr. F. mentioned some interesting cases of the exercise of this sentiment by the lower

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animals. When excessive, it leads men to be more generous than just, but when powerful, it is often a great check upon the worst propensities. Mr. F. considered the existence and locality of this organ so sure as to settle the disputed point whether man has any innate benevolence, or whether he is always moved by selfishness. Mr. F. thought the whole system of public benefactions extremely defective, in so far as they only relieve instead of preventing pauperism. He looked to phrenology for an entire reformation of the pauper system, and of criminal legislation.

The last organ explained in this lecture was *Veneration*. By itself, he said this organ may lead us to venerate everything animate or inanimate, just as circumstances of country, birth and education influence it. It is shown in respect for parents, teachers and superiors, as well as in religion. In reply to the objection that, if religion is innate, what is the need of revelation? he observed that every faculty must be educated and needed instruction, and this, perhaps, more than any other. Mr. F. said that it was the opinion of Dr. Spurzheim that in this country the children had too little of this sentiment, and a head with large firmness and benevolence, with a cavity between them, was one of the most common in our schools.*

Mr. Fowle seemed to think there was a lack of that veneration for titles, birth, wealth and similar distinctions, which the institutions of the old world are calculated to foster, but he thought the progress of Webster in the West, and of Clay in the East, pretty good evidence that this people possessed reverence enough for talents and patriotism, as did the tour of the President prove their respect for official station, although not attained, perhaps, by their instrumentality. As to the highest object of veneration, he

* Perhaps Dr. S. had attended some of the public courses of lectures to which minors are admitted, and had witnessed some of that disregard of propriety and disrespect for time, place, and person which have brought a reproach upon the youth of our city. It has been mentioned to us that a course of lectures proposed to be delivered to our boys, by an accomplished gentleman from a neighboring city, was actually suspended in consequence of the want of decorum manifested by his 'irreverent auditors!' Parents should see to this.

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thought the hundred thousand spires, which, however, dedicated to different tenets, all united in pointing the devotion of this people upward, a sufficient proof that we were not inferior to other nations.

The location of all these organs was shown on skulls and drawings, and the excess or deficiency of each was shown on a great variety of casts of known characters. We have been rather prolix, but after all this is but a meagre outline of a long lecture.

COMMENCING at the fourth lecture, we are obliged to report Mr. Fowle's lecture ourselves. Though meagre, it is believed the synopsis of this, together with the fifth and sixth, is essentially correct. It is not our intention to make an effort to gain proselytes to the doctrines of phrenology, though firmly convinced of the truth of the leading principles. An apology is unnecessary for presenting this scheme of a popular course of lectures, which was repeated and very fully attended. Mr. Fowle is not only thoroughly acquainted with his subject, but sustains, in this community, the reputation of being a man of unwearied industry.

The first organ described was *Firmness*. This gives steadiness of purpose, and constancy of character when well developed. Fortitude, patience, perseverance, determination, are various manifestations of it, and some of its abuses are obstinacy, stubbornness, and infatuation. Mr. F. said that some of the propensities and sentiments acted only on objects without, but firmness, self-esteem and concentrativeness acted upon the other powers.

Conscientiousness, as nearly as we could understand, is almost synonymous with the moral sense or conscience. Mr. F seemed to think the discovery of this organ, settled the long disputed question, as to the source of the universal sense of right and wrong, which is acknowledged to exist. The organ exists in every one, but, like other organs, may be more or less educated. Mr. F. gave a sketch of the various opinions of philosophers on this subject, and pointed out the predominant difference of character which led to their different theories. He thought it not improbable that phrenology might usefully guide us in the selection of men for high trusts. This organ influ-

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enced the others. The naturally timid, for instance, have, by the aid of this organ, shown an unusual degree of courage. Conscientiousness excited small combativeness to unwonted activity.

The next organ, *Hope*, is a cheerful one. It constantly encourages man to exertion, but when deficient, it leads to gloomy and foreboding prospects. Mr. F. thought it often came to the aid of the religious principle, bringing with it the responsibilities of a future existence. Hope, Mr. F. said, was not desire. Every faculty had its desire to be gratified. Desire is often strong when hope is nearly extinguished. Alluding to the organs of veneration and hope, Mr. F. very aptly introduced an extract from Pope, which shows the influence of both organs in a pleasing light.

> 'Lo the poor Indian, whose untutored mind
> Sees God in clouds, and hears him in the wind;
> His soul proud science never taught to stray
> Far as the solar walk, or milky way,
> Yet simple nature to his HOPE has given
> Behind the cloud-topt hill a humbler heaven.'

Marvellousness gives a propensity to believe in the wonderful and supernatural. Mr. F. thought this organ had great influence upon the religious belief of men, and every form of religion, even the christian, was tinctured with it.

The history of most nations abounds in the marvellous. Few persons are free from its influence. It is seen in the belief of dreams, omens, fortune-telling, astrology, ghosts, devils; in the love of romances, fairy tales, &c. &c.

Ideality is the poetry of nature. The other faculties perceive qualities as they exist, but this faculty is never satisfied with plain realities; it seeks the *beau ideal* above nature, and if excessive, leads to dissatisfaction with the things of earth. Mr. F. defended the poets from the charge of lacking common sense, and mentioned the singular fact that in the heads of murderers this organ had always been found defective. He showed several skulls to prove the fact, as he had previously contrasted skulls of poets, romancers, schemers and honest men with those of men who lacked ideality, marvellousness, hope and conscientiousness.

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Mirthfulness or *Wit* is situated near ideality, and Mr. F. took occasion to remark that neighboring organs, especially if they form part of the same convolution, often act together and influence each other. He thought this organ, like that of tune, was intended to make man a cheerful being. When large, it is attended with an irresistible propensity to view objects in a ludicrous light. With imitation it makes comic actors, with form and coloring it makes caricaturists, &c.

Various casts were shown to demonstrate the location of this and the other organs mentioned. The cabinet of Mr. F. must be very extensive, considering the infancy of the science in this country, and his paintings are on a fine scale for large auditories.

Mr. F. then proceeded to give some account of the other class of powers, called Intellectual. These he subdivided into the external senses, the organs which perceive the impressions made on the senses, and the reflective powers. He did not attempt a description of the senses, but showed, by a variety of considerations, that phrenology casts much light upon their functions. He also maintained that the senses themselves do not form ideas, but need the special organs called *perceptive*. The proofs of this position were chiefly drawn from the exercise of faculties which could not have been instructed through the senses, as in the case of the deaf, dumb and blind. He thought phrenology would aid the philanthropist in conveying mental light to these unfortunate beings.

We have not time to follow Mr. F. in his particular description of the perceptive powers. They chiefly lie above the nose and over the eyes. While describing the organs of individuality, size and weight, he noticed the objection to the truth of phrenology which arises from the sinus or cavity caused by the separation of the two surfaces of the frontal bone. He acknowledged that this cavity was an obstacle in the way of a correct judgment as to the *size* of the organ within, but he denied that it was any objection to the truth of phrenology; for 1st, there was no sinus in the child's head, in which the location of this organ had been determined beyond question;

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2d, the location had been determined by actual examinations of the brain itself, and by comparisons of its developement with the known character; and 3d, if the sinus so interfered as to destroy all proof of the few organs affected by it, there is no such obstacle in the way of the other numerous organs. He exhibited several skulls divided in various ways, to show the nature and extent of this frontal sinus, and other skulls of children, and even of adults, in which it did not exist at all.

When speaking of *Color*, he gave some amusing anecdotes of persons who lacked the power of distinguishing colors, and particularly, of one gentleman who lost a coat that he had worn a year, and could not advertise it, because he could not describe its color.

He gave some interesting anecdotes illustrative of the functions of *Locality*, and particularly, an account of the blind traveller, Holman, who has just returned from a visit to New Holland, and is about to publish his travels.

The lecture closed with an account of the organ of *Order*, which Mr. F. thought the parent of neatness.

[TO BE CONCLUDED IN OUR NEXT.]

[Furnished for the Tracts and Lyceum.]

POPULAR BOTANY.—No. IV.

In my first article on this subject I was led, by a contemplation of the confusion in the popular, and which even exists to some degree in the scientific nomenclature, to make some remarks, showing the nature and extent of this evil. In the two latter numbers, I have thrown out some general hints upon several subjects which were deemed of vital importance, as a portion of the field which this science does or should cover and explore; and which I thought not inappropriate to 'popular botany.' Facts, are things the mass of people are most strongly impressed with. Theories and systems are beyond their reach, and

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still more, counted of no importance. To begin with teaching the names of the hundred and forty-five forms of leaves, the parts and organs of a flower, the twenty-four classes and as many orders, and much of it in what would be to most an unknown tongue, would be to them a very unpromising beginning.

I propose to continue this series with descriptions of plants and their uses and explanations of their names. I shall endeavor to give as much valuable and useful information respecting each plant I have occasion to mention, as can be conveniently done. Such, is considered to be the botany which is needed; not overlooking vegetable physiology and anatomy of plants, which are all-important branches.

LAUREL.—This is the proper name of a plant, of the genus whose scientific name is Laurus, which is, in fact, the English of that Latin word. I shall describe in order some of the most important species of Laurus. The bush we call laurel in America is not a true laurel, in this sense, but is so called because its leaves look like laurel leaves, (i. e. of the bay-tree.) Its scientific name is Kalmia, named from Kalm, the discoverer.

LAURUS NOBILIS, (*noble laurel,*) called the bay tree, is the first species of laurel I shall mention. It is a native of the south of Europe, as for instance, of Italy and Greece. This plant was made into crowns, as prizes of distinction among the ancients, and for this reason, laurels have come to signify poetic honors. The word bays, from bay, the other name of this tree, has the same meaning. The leaves found in drums of figs are, I have been told, laurel or bay leaves. It is a beautiful and evergreen tree.

LAURUS CINNAMOMUM, *(Cinnamon laurel.)* This is the cinnamon tree, which is found in greatest perfection in the island of Ceylon, if indeed it is a native of any other place. The beautiful aromatic flavor of the bark renders it a favorite article of spicery. I do not, however, believe that more than one half of what is sold under the name of cinnamon is the real produce of this tree. It is said to have greenish yellow flowers, and to bear a fruit like an acorn. The cinnamon is the inner bark of the small

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boughs, which are cut after a three years' growth, and the bark carefully peeled off. Each piece is tasted to test its quality, before it is packed for exportation.

Camphor is procured from another species of laurus, and also from some other trees. Various accounts are given of the mode of procuring it, which is probably different in different places. It seems to exist in the wood and root of the tree. It is found in Japan, some of the Spice Islands, and most probably, in China and the adjacent islands.

LAURUS CASSIA, *(Cassia laurel.)* A kind of laurel much resembling cinnamon, but of inferior quality, and less rare. Cinnamon is undoubtedly adulterated with the bark of this tree, and indeed cinnamon is sometimes sold in the shops under the name of cassia, and some are led to suppose this title to indicate the best kind, but this I very much disbelieve. It is so easy to impose upon the unsuspecting and less learned portion of the community, that the opportunity is, it is feared, seldom neglected where detection is so difficult.

LAURUS SASSAFRAS *and* L. BENZOIN. These are our sassafras tree and spice or fever bush. They are also, by botanists, reckoned laurels, though somewhat differing from the above-described species. They are two of the most agreeable aromatics our native vegetation affords, and are not unworthy of consideration on account of their medicinal properties. When this country was new, immense quantities of sassafras root were exported to Europe, as an article of medicine, probably a panacea or universal remedy, like 'botanical drops,' or 'elixir vitæ.' It is, however, without doubt, useful, and finds a place in the materia medica. The fever bush I have been unable to find in medical works. This name it has without doubt received from its supposed efficacy in fevers. It is certainly to some degree, in repute, as a popular medicine. Such things ought not to be entirely overlooked. The people may sometimes mistake, but they are not always wrong. Both these trees abound in New England. Their leaves and bark, besides containing an aromatic principle, abound in mucilage.

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LAURO-CERASUS, *(Cherry-laurel.)* This is a tree called laurel in England, and is a species of the plum or cherry family. It is poisonous, containing prussic acid, as the whole family of stone-fruited trees do, either in the leaves, flower, or the kernel of the fruit. Why the name laurel was ever applied to this tree it is impossible for me to imagine.

KALMIA, *(American laurel.)* This plant is well known to every one. The low kind, called sheep-laurel, is said to be poisonous to sheep. The mountain laurel is much esteemed, and its wood has been made use of for some purposes to which box-wood is applied. It has a beautiful flower, which the lover of nature will do well to examine.

QUERCUS, *(Oak.)* This useful tree is most extensively known, inhabiting almost all climates except the frigid zone. In the temperate climates on the plains, and in the torrid zone on the mountains, it rivals other trees of the forest in magnificence and usefulness. The species of oak in our country are numerous, but we shall speak in particular of but few. The white-oak is probably the most useful timber-tree we have. Whether it excels the oaks of 'Old England,' however, I cannot determine. Equally serviceable is the live-oak, or evergreen oak of the South, the incorruptible quality of whose timber makes it peculiarly suitable for ship-building. It is from an oak, which grows abundantly in the south of Europe, that cork is procured; it is said to be the bark of the tree. The oak in ancient times, among the Greeks, was sacred to Jupiter; and among the Druids—the priests of the pagan inhabitants of Britain—it was regarded with peculiar veneration.

The Rose. Of this most beautiful and celebrated flower there are more than a hundred species. Of these, several grow wild in our own country. In Persia the rose grows in greatest perfection, and the love of the nightingale for its beloved rose-tree, in which it delights to make its nest, is a favorite theme of Persian poets. There have been discovered no roses south of the equator, so that we have reason to believe that one half of our globe is destitute of this

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delicious flower. Those regions, however, possess others to supply its place. Most of our beautiful geraniums are brought from the Cape of Good Hope.

Dyes.—In a valuable French work, which has never been translated into English, (Dictionnaire d'Histoire Naturelle,) I find it stated that the leaves and flowers of the wild balsamine, or jewel-weed, which is abundant by streams, will give a yellow color to wool, and also that the native inhabitants of some parts of America eat it as a sallad. By the way, this Dictionary, which contains a complete account of the animal, vegetable and mineral kingdoms, highly deserves to be englished. B. B.

[Furnished for the Tracts and Lyceum.]

MUSIC.

In the minds of many, a question arises that is more difficult to decide than appears at the first glance, whether music has not attained a rank and importance among our pursuits that places it above the sister art of painting, and very nearly upon a level with poetry, in its immediate effects upon our manners and happiness.

By the vast space it fills in education, in the occupation it affords publicly and privately, connected as it is with sentiment, and efficacious as it must be in producing a state of mind infinitely more susceptible of the impressions of the higher art with which it is associated—through each of these circumstances, it should seem to possess a degree of direct power and authority scarcely accessible to verse, honored even as the poet is in our days.

The effects of poetry are more certain and more durable, but they are more slowly wrought, and perhaps they are neither felt so early, so intensely or so universally as those of music. The prodigious and rapid circulation of musical productions, together with the number of musical performances, both public and private, congregate together, render it doubtful whether a larger portion of the

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public be not moved by the one than by the other. If our premises are well-grounded, it must be granted, that in the progress of manners a momentous change in favor of music has lately been effected; a change too, that makes it peculiarly incumbent upon those who undertake to convey a descriptive portraiture of the intellectual and moral features of the age, to watch and narrate the circumstances and incidents of the permanent institutions, which those who are employed in public exhibitions, in the professional propagation, or in the private cultivation of music, may from time to time engage in or attain.

There are, in art, *fluctuating* as well as *fixed* principles. These are commonly among the characteristics of national taste; they serve also to mark the changes which time and the intercourse with other countries produce. To these combinations of nature and art we may attribute the rise, the progress and the present state of music in this country. Poetry and painting are referable only to nature, with an allowance which the mind readily gives to the *beau ideal*, or to the standard of imaginary beauty.

Our admiration of the poet or the painter is guided by the *resemblance* which their productions bear to nature; of this every man is in a degree a judge. In singing, art has departed so widely from the primitive expression of natural passions, that there is little which affords an object of comparison. In this department of musical science, taste depends much more upon cultivation than in any other art, since the graces of singing are almost entirely factitious; many of those most in esteem are valuable only for their difficulty in execution, and the labor and practice they consequently imply, and many are such as an untaught ear would condemn as absurd: but that singing is consonant to nature in the degree that it is really good, I believe to be demonstrated by that universal testimony which the general approbation of a mixed audience never fails to bestow. The proximate cause of this almost unerring criterion appears to be in distinct articulation and pure tone, constituents of excellence which every one is capable of distinguishing.

P******.

[TO BE CONTINUED.]

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[Furnished for the Tracts and Lyceum.]

POPULAR WHIMS AND SUPERSTITIONS;

Relating more especially to the Practice of Medicine in the Nineteenth Century.

THE object of the Tracts and Lyceum is to enlighten the public mind, and to emancipate it from the thraldom of superstition and ignorance. Just so far as the light of science prevails, just so far will superstition and ignorance recede. The difference between a learned and ignorant man is so immense that it would require volumes to elucidate it; but happily, the numerous interesting publications in our country on the subject of education, are redeeming us from the fetters of ignorance; and the shackles of superstition always fall before the light of science. On this score, the inhabitants of our beloved republic are far more enlightened and intelligent than those of monarchical Europe. Still the unenlightened remain in the grossest darkness; but we hope their numbers are fast diminishing.

Some of the popular superstitions of the present day, respecting the practice of physic, may show the errors with which physicians have to contend. They may likewise show that information has not extended among the people at large to so great a degree as is generally believed. They may be curious relics for succeeding generations. They will teach that men of the present day, who are uneducated, have made but a small advance from the Goths and Vandals of ancient Europe, and from the Greeks and Romans, who prognosticated future events from the writhing entrails of dying birds and beasts. Science, and that alone, will ultimately remove these errors; but, in the language of an elegant writer, 'Before truth, in its silent and disputed march, has roused the attention of the indolent, converted the supercilious, subdued the interested and obstinate, and reached the ears of all, an age has passed away.'

Whim 1*st*. It is a general belief that the green bark of elder, *(Sambucus canadensis,)* scraped up the stalk, and taken in decoction, will produce vomiting;—scraped

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down, it will produce a cathartic operation. An intelligent physician, who heard the observation, humorously remarked, 'Yes, and scraped round the stalk, it will pass directly out at the navel.'

2*d.* Take a live black snake, and bite him through from his head to his tail, and the teeth will never afterwards ache or rot.

3*d.* Another. To prevent future attacks of the toothache, extract a tooth, and bore a hole with an augur into the *north side* of a white-oak tree, and place the tooth therein. Plug up the hole, and the remaining teeth will never ache until the plug decays.

4*th.* In colic, inflammation of the bowels or inflammatory rheumatism, skin a sheep or a cat *alive*, or open a hen alive, and apply her, or the warm skins of the animals, to the affected part, and they will immediately relieve and cure the disease.

Remark. That warmth may be serviceable in these complaints is undoubtedly true, but the same benefit would unquestionably result from applying an emollient poultice.

5*th.* Steep the excrements of a sheep or lamb in cider, and give it to a patient in the measles, and it will effectually force out the eruption. This is known by the name of 'nanny tea.'

6*th.* To cure the epilepsy, or falling-sickness fits, procure the upper part of the skull of a dead man, pulverize and take it every day until the patient is cured.

7*th.* Wearing a red string or a string of gold beads round the neck will cure or prevent the nose-bleed. Wearing a tansy-bag on the stomach will cure worms.

8*th.* Throwing a woman's milk into the fire will dry it up in her breasts. Milk a cow upon the ground, and you will dry up her milk. If you kill a toad it will cause your cow to give bloody milk.

9*th.* Innumerable are the whims and superstitions with regard to the cure of warts. Caustic and the knife will undoubtedly eradicate them. Sometimes they will go off of themselves.

Steal a piece of fresh meat and bury it; as the meat rots the warts will disappear. Throw the meat into a

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neighbor's well, and the warts will recede, and your neighbor will have them.

10*th*. The membrane which frequently invests the head and body of a child at birth is called the veil; take this veil, wash it, and lay it into a drawer. If any of your family are absent, at whatever distance, whenever you examine this veil, if it is red, you may be sure that the absent person is well, but if it is pale, you may be sure that he is dead. If you examine it every day, you can tell the day he died.

11*th*. *Sayings upon child-birth.*

Monday, fair in the face;
Tuesday, full of grace;
Wednesday, sour and sad;
Thursday, merry and glad;
Friday, loving and giving;
Saturday, work hard for a living;
Sunday, never to want.

12*th*. Nail a horse-shoe over the threshold of your door, and it will drive off witches.

'The sacred horse-shoe, guardian of the whole,
Terror of sprites profane and witches foul,
Dread, powerful talisman, 'gainst imps unknown!
Nail'd on the door, in silent mystery shone.'

This superstition is of ancient date, but it is much believed in by the ignorant at the present day.

13*th*. The belief in the divining rod is prevalent. The rod is of witch-hazel, *(Hamamelis virginica.)* Whenever the conjuror walks over the ground where the supposed mineral is, the rod will incline towards the mine.

14*th*. The moon, with many people, has a great influence upon the operations of husbandry, manufactures, and many diseases. It is believed that you cannot make good soap in the old of the moon; but if you make it in the new of the moon, and when the tide is coming in, you will uniformly be successful. So of killing hogs: if you butcher them in the new of the moon, or when it is nearly at its full, your pork will swell in the pot while boiling; but if you kill them at the old of the moon, or when it is in the wane, your pork will shrink in the pot. Particular attention must be paid to the state of the moon in pruning

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your trees, sowing grain, and other operations of husbandry. The moon, likewise, has great influence upon the weather.

15*th*. Nearly akin to the superstition with regard to the moon is the belief of certain signs respecting the singing of birds, upon the weather. The whistling of a quail, the singing of the robin and of the cuckoo, and the singing of tree-toads, are certain signs of the immediate approach of rain.

16*th*. You must not *commence* any work upon Friday, or engage in any new business; if you do, you will be sure of being disappointed.

17*th*. In case of amputated limbs the belief is, that the limb cut off feels every impression upon it, in the same manner that it did before it was amputated. If it is heated by the fire the patient also feels heat; if it be struck, the patient likewise feels the blow.

18*th*. *Consumption.* A superstition somewhat common among the most illiterate classes of the community is, that if the portions of the lungs which remain after a friend has died with the consumption be taken out and burnt, the remainder of the family of the deceased will never afterwards be liable to the complaint. I have known the bodies of three or four people, who had died of consumption, disinterred, some of whom had been buried six or seven years, and their viscera burnt to ashes. What is remarkable, a physician attended as master of the ceremonies.

19*th*. But of all the superstitions with which we have to contend, that of resorting to patent secret medicines, and to patent steam-quacks, is the most common, the most humiliating, and the most degrading. Other superstitions debase the human mind; these sport with, and destroy human life. In continental Europe the sale of secret remedies is prohibited by law, while in England and the United States, it is made profitable to the government. 'Ignorance and credulity,' says Dr. Darwin, 'have ever been companions, and have misled and enslaved mankind.'

W.

April 23, 1834.

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BOSTON INFANT SCHOOL SOCIETY.

THE following communication is entitled to respect; and we can assure the friends of *Infant Schools*, that the editor of this periodical is always happy and in readiness to promote the cause of education by any means in his power. Let us hear from our correspondent again.

To the Editor of the Tracts and Lyceum.

MANY highly respectable individuals are either entirely opposed to, or are sceptical about the utility of the Infant School System, among whom, possibly, you may be ranked. If the latter be true, believing you to be open to conviction at all times on all subjects, I would refer you to a very interesting Report, lately issued by the Infant School Society of this city. It is ably and handsomely written, and of a strictly practical and common-sense character—a plain statement of facts and arguments, without exaggeration, or any attempt to do more than give the Institution its proper place among the benevolent institutions of the day. Moreover, the excellency of the social and intellectual character of the individual who, I understand, drew up the Report, entitles her to a candid hearing on all subjects upon which she may choose to write.

Believing, as I do, that the Infant School System is calculated to lessen the cares of many mothers whose time is necessarily employed in indispensable occupations, and to prevent young children from being too much neglected, and under judicious management, to invigorate the faculties both of body and mind in the young pupils, I hope that attention will be devoted to the discussion of the subject in future numbers of the Tracts and Lyceum which its importance deserves. The philosophy of the developement of the mental and physical powers of children is one to which I hope to have opportunity, on some future occasions, to invite the attention of your readers.

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CONCORD LYCEUM.

PERHAPS the accompanying Constitution and By-laws of the Concord Lyceum are as unexceptionable as could be devised, and we therefore give them entire, as a model to work from, in organizing similar Societies. Not a word is said about *public lectures*, the very life-blood of Lyceums. Without instituting a regular course of popular lectures, the institution must certainly deteriorate, and ultimately die. The experience of years, in Boston, clearly demonstrates the advantages of lectures, at stated periods, cost what they may.

PREAMBLE.

BELIEVING knowledge and virtue, united, an unerring passport to prosperity and happiness, and that there are various means by which these great ends may be accomplished, but none more sure than Societies, where the efforts of all tend to mutual instruction, we, the undersigned, do therefore agree to form ourselves into a Society, and adopt the following

CONSTITUTION.

ART. 1. This association shall be called the CONCORD LYCEUM.

ART. 2. The officers of this Society shall be a President; two Vice Presidents; Secretary; Treasurer and Auditor, to be chosen quarterly by ballot.

ART. 3. It shall be the duty of the President to call special meetings at the request of the majority of the members; to preserve order; to appoint a member at each meeting to propose a question for the next debate; to appoint some member to deliver a Salutatory Address at the opening of the next meeting; to propose a subject for Dissertation; appoint members to act on the debates, should not a sufficient number hand in their names; lay before the Society applications for membership, and communications of any kind, which may relate to the affairs of the Society, and deliver a Valedictory Address at the close of each quarter.

ART. 4. In the absence of the President, it shall devolve upon the 1st. Vice President to occupy the chair; and in the absence of the two before mentioned officers, the 2d Vice President will preside.

ART. 5. It shall be the duty of the Secretary to call the roll at the commencement of each meeting; note delinquents, and return their names immediately to the Treasurer; read the proceedings of the last meeting; inform all new members of their election; give certificates of membership; and record the proceedings of the Society.

ART. 6. It shall be the duty of the Treasurer to hold the funds of the Society; defray its expenses from the same; collect all dues,

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and keep an account, which shall be laid before the Society at the expiration of each quarter, and shall see that the Hall is lighted on the evening of the meeting, and take care of the same.

ART. 7. It shall be the duty of the Auditor to examine the book kept by the Secretary, and also the account of the Treasurer, and report at the last meeting of each quarter.

ART. 8. The expenses of the Society shall be defrayed by fines, initiation fees, and assessments, if necessary.

ART. 9. Any person wishing to become a member of the Society, must make application personally or through some member of the Lyceum, to the President, who, at the next meeting, shall lay the same before the Society, and the applicant shall in no case be present when the vote for his admission is taken. After having been voted in by ballot, the Secretary shall inform him accordingly, and by subscribing the Constitution, and paying twenty-five cents to the Treasurer, he becomes a member.

ART. 10. The meetings of the Society shall be held from time to time as determined by vote.

ART. 11. The exercises of our meetings shall be Addresses, Reading, Debates, Dissertations, Compositions, Declamations, or any others that may be deemed expedient.

ART. 12. The order of exercises at each meeting shall be:—1st, An Original Salutatory Address, by some member of the Society; 2d, Reading; 3d, A Debate, by some four members; 4th, A Written Debate; 5th, A Dissertation on the subject proposed by the President, by any of the members; 6th, Each member will be called upon by the President, and will read Composition or declaim as he may be prepared.

ART. 13. The debate, and all other questions coming before the Society, shall be determined by a majority of the members, the former according to the weight of argument advanced.

ART. 14. Honorary members may be admitted, and not required to conform to the rules of the Society.

ART. 15. Any member, after paying up all arrearages, and leaving a written notice with the Secretary, may withdraw himself from the Society.

ART. 16. This Constitution may at any time be altered or amended by a vote of the Society.

BY-LAWS.

1. There shall be two critics appointed by the President at each meeting, who shall, to the best of their ability, with kindness and discretion, make such remarks as may occur to them in relation to the extemporaneous performances of the members, and shall inspect all written exercises, and make their remarks thereon at the next meeting.

2. Spectators may be invited into the meetings of the Society by the members.

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3. Any member who shall speak to another aloud, or leave his seat during any exercise of the Society, shall be fined six and a quarter cents.

4. When a member wishes to make a motion, he shall rise and respectfully address the President.

5. When a question is once carried, it may be in order for any member in the majority to move a re-consideration thereof.

6. The President shall vote only when the Society is equally divided, or when his vote, if given to the minority, will make such an equal division.

7. When two members rise at the same time, the President shall decide who shall have the precedence.

8. No motion shall be debated until the same is seconded, and if requested, the same shall be reduced to writing.

9. When the Yeas and Nays are required upon any question, each member called upon shall, unless he be for special reasons excused, declare openly his assent or dissent to the question, by answering *Aye* or *No*.

10. When a question is under debate, no motion shall be received but to adjourn, to postpone indefinitely, to a day certain, to correct or amend, which several motions shall have precedence in the order they are named.

11. It shall be a standing order of the Lyceum, to resolve itself into a committee of the whole on the state of the Society. In forming a committee of the whole, the President shall leave the chair, and name a chairman to preside.

12. No sectarian religious questions shall be discussed in this Society.

13. Three members shall be necessary to constitute a quorum.

14. If any member transgress the rules of the Society, the President shall, or any member may call him to order, in which case the person so called to order shall sit down, unless permitted to explain, and the Society shall, if appealed to, decide on the case without debate. If there be no appeal, the decision of the chair shall be submitted to.

15. If any member is absent from any meeting of the Society, and cannot offer a satisfactory excuse, he shall pay a fine of twelve and a half cents.

16. Any member appointed on a debate, who shall neglect to act accordingly, or procure a substitute, shall be liable to a fine of six and a quarter cents.

17. Any member who shall neglect to act on any required performance, except debate, without offering a reasonable excuse shall pay a fine of six and a quarter cents.

18. Any member may be excused from the payment of any of the above fines, by a vote of the Society.

19. Any member who shall behave disorderly in any meeting, or shall disregard the Constitution or By-Laws, shall be reprimanded by the President, and if the offence is of sufficient magnitude to merit such a proceeding, he shall be expelled.

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20. The person proposing the question for debate shall be, in all cases, considered an actor thereon, and shall be entitled to a choice of colleagues, and the one who volunteers, or is appointed first, to a choice of sides.

21. A Public Address shall be delivered before the Lyceum, by some one of its members, at the commencement of each Quarter, who shall be chosen by ballot, at the election of officers, one quarter prior to the time of delivery.

ORIGINAL MISCELLANY.

BURIALS IN HAVANA.—The following items are from the journal of a young gentleman of Boston, now on his travels, from whose diary, a few weeks since, an account of the 'Sand at Sea,' on the coast of Africa, was taken. Further notes, from time to time, are promised us.

JAN. 8th, 1834.—After dinner, we rode on horseback, a few miles out of town. We stopped at a burial-ground about two miles beyond the walls. Just as we got there, a dozen or two negroes arrived from the city, four of whom bore a coffin on their shoulders. At the gate, one of them handed a ticket to the door-keeper, and they all passed in. We tied our horses and followed them. They carried the dead negro to the first of a line of graves, took him out of his coffin, put him in the grave, and covered him over with earth.

There were many graves ready for their tenants. The people here are very economical in the use of their ground. The graves are dug more like trenches than anything else. A little partition of a few inches in thickness separates the graves. When one line is finished, apparently, another is begun by its side. The graves are not dug promiscuously, all over the yard, as with us, in New England. The ground must have been used over many times, for skulls and bones were scattered all over it, and at each corner there was a large bin filled with dried bones; each contained at least twenty cart-loads. In each of these bins is a pyramid thirty feet high, with a Latin inscription painted on it.

After seeing the negro so unceremoniously disposed of, we wandered over the yard. There are two paved walks, crossing at

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right angles, in the middle, with an iron fence on either side. At the head, opposite the gate, there is a very pretty little chapel. The door was made of iron lattice work. We looked in a few moments, and saw a beautiful altar, on which stood a small figure of the crucifixion. On the wall back of it is a picture of the resurrection from this very yard. In the back-ground of the picture was seen this little chapel, and before it, people of all ages rising from their graves at the sound of a trumpet, which an angel in the clouds above was represented as blowing. Around the chapel were some very pretty tomb-stones, showing us where the counts, ecclesiastics, governors, and other great men of the land slept. The yard is surrounded with trees, but there were but few within the walls, and those were by the side of the walk. As we came out, we met two negroes with a dead negro child on their shoulders, in an open coffin. The child had a bunch of roses in its hands. The men left it in the yard, and carried the coffin back with them.

On our way to the place where we had tied our horses, a few rods distant, we met another funeral procession, consisting of a hearse and several volants. We turned about to note the difference between the burial of the poor negro and this person, who was of gentler or richer blood. The coffin was taken from the hearse, and followed to the yard by five priests and two gentlemen, who were talking and laughing as if they were not concerned in the things which were going on. They stopped at the entrance of the yard, and took the top from the coffin, showing an elderly lady therein. The five priests arranged themselves by its side, and set up such a howling and singing, that it must have sounded more like the exultation of wild Indians over their dying prisoners, than like soft music over the grave of a christian. They continued about five minutes, when the bearers (four negroes in livery dresses) closed the coffin and carried it to the grave. The priests sauntered about the yard a few minutes, and walked off. We continued our ride till dark, and then returned to the city by another road.

Jan. 10th.—There were, before breakfast, two or three showers, by which more water fell than usually falls in as many days of hard rain, in New England. This too, in winter, when the rain falls in moderate quantities, compared with the rains of other seasons. These violent showers are of great benefit in washing the streets, which otherwise would be dirtier than even the streets of New York.

Jan. 13th.—This evening we called on a friend. While there, a shower came up, and for half an hour the rain fell in torrents.

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When it ceased raining we were about to return, but found the water a foot deep in the middle of the street, and half a foot deep on the side-walk, close by the door. We returned, and prolonged our visit half an hour, when the water had subsided, so that we got home without wetting our feet.

I was told the rain this evening was quite moderate, compared with the showers of the rainy season, when sometimes, in some of the streets, for a few minutes, the water reached up to the bellies of the horses. I have seen that some of the shops are provided with a water-tight slide for their doorways, to keep the water out.

EXAMPLES OF THE GREAT CAPACITY OF NEGROES.—Beside being exceedingly expert mechanics, there have been instances of slaves, in this country, who purchased their freedom by their extraordinary musical exertions. FREIDIG, of Vienna, was not only a splendid musician, but was also an excellent painter and draftsman. LISLET, a colored man of the Isle of France, was named a corresponding member of the French Academy, on account of his excellent meteorological observations. HANNIBAL, a man of rare talents, was made a colonel in the Russian army; and FULLER, who lived in Maryland, was so very remarkable in figures, that when asked the number of seconds a man had lived, who was seventy years old, he answered in a minute and a half. MADOCK was a powerful Methodist preacher, and AMO, who was brought from the coast of Guinea, took the degree of doctor, at the University of Wittenberg. CAPITIEN, bought by a slave-dealer, when eight years old, studied theology at Leyden, and published sermons and poems. IGNATIUS SANCHO, born in a slave ship on the passage from Guinea, and VASA, who was brought from the kingdom of Benin, have both distinguished themselves as literary characters. PHILLIS WHEATLEY, of Boston, was a woman of unquestionable talents, and so was the Rev. THOMAS PAUL, of this city, who, for many years, preached in a church which was erected by himself.

ROYAL SOCIETY.—Mr. Farraday, the distinguished practical philosopher, has been reading, of late, at successive meetings, his very accurate observations on *electro-chemical decomposition*. At one of these learned conversaziones, a paper was presented on the structure, functions and vitality of *polypi-zoophytes*, and other compound animals resembling them.

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BAROMETER.—This useful instrument was unknown, till it was discovered that the air had weight. The ancients supposed that water rose in a pump because nature had a horror of a vacuum. For more than a thousand years, philosophers spoke of the antipathy which nature entertained of a vacuum; and, to this day, the old notion might have been perpetuated, had it not been for the following circumstance. The superintendent of the water works of the Duke of Tuscany, wishing to raise water by means of a pump to a considerable height, was surprised that it would not ascend higher than thirty-two or thirty-three feet. Having carefully ascertained that there could be no defect of the pipe or pump, he mentioned the circumstance to Galileo, and requested him to give an explanation of the cause. Either questioning the justness of the opinion which then prevailed, or being unable to assign any other, he replied, 'The water was raised to the height of thirty-two feet, on account of the horror nature had for a vacuum; but that the horror was limited in its effects, and ceased to operate above that elevation.' Torricelli may be regarded as the inventor of the barometer.

MARINER'S COMPASS.—A certain Mr. Burgess, who gave a lecture before the Asiatic Society, in March last, not only calls in question Sir Isaac Newton's theory of gravitation, but he intimates that the ancients had a knowledge of air-balloons and locomotive vessels and the compass. The arrow, said the lecturer, by which Abaris, the Scythian, was enabled to find his way through unknown countries, was the magnetic needle; and while the self-moving ships mentioned in the Odyssey, were probably vessels furnished with wind-mills, the air-balloon is identified as the invention of Dædalus,—and particularly so, as he cautioned his son Icarus not to fly too high or too low, for fear of dissolving the wax by which the artificial wings were attached to his body.

FIRE OF BAKU.—On the Caspian sea, in the province of Schirvan, in Persia, near the seaport of Baku, where the land is dry and rocky, a large hollow cane is fixed in the ground, through which rushes a blue flame, more gentle than that which is produced from spirit of wine, called the *everlasting fire*, because the people believe it has burned ever since the flood, and will continue to the end of the world.

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SWIMMING CHILD.—Mr Crawford, when at the capital of Siam, the last season, saw the famous swimming child, of which mention has been made in the English journals. She is a little girl, only three years of age, by the name of *Lui-noi-nam*, who cries and frets continually, unless put into the water, where she appears to be perfectly happy. When only one year old, this disposition for the water was manifested. She does not swim like human beings, but rolls over and over, as light as a cork. She can neither speak nor walk. The mother, a good looking woman, has three other children, but they possess no such propensity. The swimmer is blind with one eye, and what is quite remarkable, has never tasted any other food than her mother's milk.

BANANA.—No fruit is more delicious or prolific than this. There are two species, known however among navigators by the terms *short* and *long* bananas. Each banana grows to about the size of an inch and a half in diameter, and six or ten inches in length. The stalk very much resembles common Indian corn, about which the fruit winds like a spiral stair-case.

PERIOD OF INCUBATION OF EGGS.

Swan,	42 days.	Duration of life, about 200 years.
Parrot,	46 "	100 "
Goose,	30 "	80 "
Eagle,	30 "	unknown,
Bustard,	30 "	"
Duck,	30 "	"
Turkey,	30 "	"
Peacock,	26 to 27 days.	25 to 28 years.
Pheasant,	20 to 25 "	18 to 20 "
Crow,	20 "	103 or more.
Nightingale,	19 to 20 "	17 to 18 "
Hen	18 to 19 "	16 to 18 "
Pigeon,	17 to 18 "	16 to 17 "

The crane, heron and ostrich leave their eggs almost entirely to solar influence, evincing little or no maternal solicitude.

TO CORRESPONDENTS.—A variety of articles have been received the past week, each of which will be published as fast as possible.

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SCIENTIFIC TRACTS

AND

FAMILY LYCEUM.

JUNE 15, 1834.

PHRENOLOGY

An Abstract of six Lectures on Phrenology, recently delivered at the Temple, by WILLIAM B. FOWLE, Esq.

[CONCLUDED FROM PAGE 338.]

IN the fifth lecture, Mr. Fowle began with the organ of *Calculation, or Number*. This organ, he said, is limited in its power. It is necessary to a mathematician, but alone, is not sufficient to make one. He thought it a great mistake to make mathematics, or poetry, or the knowledge of languages, or any other single excellence, a criterion of greatness. Many great men have been deficient in all these points. Mr. F. said that Dr. Spurzheim considered the large developement of calculation a national peculiarity of American children. Mr. F. remarked that this organ was often found largely developed in the brain of persons in other respects almost idiots. He showed the casts of several remarkable arithmeticians, one of Newton, &c. &c.

After noticing all the organs of the brow, Mr. F. remarked that the full developement of these often gave the forehead the appearance of retreating; and many, not phrenologists, have thus been led to undervalue the intellect of men who, in fact, have had a large intellectual developement. He showed how to measure the *depth* of the forehead, to determine the intellectual power.

In speaking of the organs of *Time* and *Tune*, Mr. F. marked the difference of their functions. He thought tune a very common organ, and the late attempts to make

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it a part of common school education seemed to prove this, for few failed to learn something of melody, and all are pleased with it. Harmony required a combination of tune, time, and other powers, and was a rare attainment. On this ground, Mr. F. said, the music at our theatres and in our churches, where the object is, or should be, to please or move the many, and not the few, fails of its effect. Mr. F. showed masks of most of the eminent composers, and remarked that the difference of their heads accounted for the different character of their compositions; in some mirth, in some wonder, in others veneration, &c., predominating.

The organ of *Language* has regard to words only, and not to their meaning. Mr. F. described the difference between natural language and artificial, the former, common to all animals, and the latter, peculiar to man. He denied that speech proceeded from the sense of hearing or the possession of the organs of voice. Some animals excel man in hearing, and one order, at least, has the same organs of speech. Mr. F. thought the organ of language necessary, for man had it, and monkies had not. Mr. F. gave a very interesting account of the proofs of the existence and proper location of this organ, drawn from injuries of the brain in this particular part, which only affected the use of language, and left the mind in other respects unharmed. The cases were very numerous and well authenticated.

The two remaining powers, *Comparison* and *Causality*, correspond to what is usually called reason. They are called also the *Reflective Powers*. Mr. F. very distinctly defined these powers, but we have only room to notice one illustration. A person, said Mr. F., who examines several heads, and compares the several organs with the character, if he finds several agreeing, as phrenologists say they do, will call it a remarkable coincidence only, if his causality be small; but if it be large, he will think the coincidence good ground for further inquiry, and will try to find the *cause* of such a remarkable coincidence. Mr. F. thought the reason why some denied the existence of a First Cause was their inability to draw conclusions, aris-

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ing from a small developement of causality; at least, we understood him to say this, and give it as the opinion of Dr. Spurzheim, as delivered in his lectures.

After finishing his description of the organs, Mr. F. gave some general views of them, in connection with the anatomy of the brain. He contended that phrenology had done more to elucidate the structure of the brain than was ever done before. He said that most of its important discoveries had been adopted, silently or avowedly, by the most distinguished anatomists. He concluded his lecture by a summary of the principal reasons for believing that the brain is a complex organ, and not a single one. They were briefly these:

1. The brain has evident divisions and subdivisions, and man has some parts which other animals have not.

2. No organ of the body can perform two different functions: how then can the brain, if it be a single organ, perform three dozen or more?

3. If the brain be a single organ, how are some faculties stronger than others, of the same mind.

4. If the brain be but one organ, the moment it exists, all the faculties must exist, and all must decay together, which is not the case.

5. The faculties of body and mind require repose. Study of one kind fatigues the mind; change the subject, and the mind is relieved, which could not be the case, if the brain were a single organ, any more than a tired hand would be relieved by taking out of it one weight, and putting into it another as heavy.

6. If the mind be a single organ, it must all sleep or all wake together; but in dreams, it is evident that some faculties sleep while others are active. The theory of dreams, said Mr. F., is beautifully as well as simply explained by phrenology.

7. If the brain be a single organ, its faculties must be all sick or all well at the same time. But in many diseases of the brain, only one mental faculty is affected. Monomania, or insanity in a single faculty, is almost as common as any other form of insanity.

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Mr. Fowle's sixth lecture commenced with a description, and occasionally an illustration, of the natural language of the various organs. We will not pretend to describe this part of the lecture, which is exceedingly interesting and important to those who would move or imitate others.

He then considered phrenology in its bearing upon education. The range was very wide. He first alluded to the importance of attending to hereditary descent, mental as well as bodily defects being handed down from one generation to another. A sound body was necessary to a sound mind. Physical education, therefore, was all important. Mr. F. severely reprobated many prevalent notions on this subject, thought the present a very feeble race of females, and augured worse for the next. He objected to learning by rote, as worse than useless, and made other important observations upon the prevalent modes of instruction. He thought phrenology would enable parents and instructors to set out right, and to adapt the instruction to the powers of the child. He next alluded to the influence of phrenology upon the healing art. A better knowledge of the human frame, and especially of the nervous system, must be beneficial, and the influence of the new science was already apparent in the improved methods of treating the insane.

Mr. F. thought phrenology altogether friendly to the Christian religion, as it was taught by its Divine Founder. He alluded to the fact that the organ of veneration is peculiar to the human brain, and as every organ has its end or object, he thought it might fairly be inferred that the end of this sentiment was God. Mr. F. thought every sect had a peculiar formation; the dogmatical had too much self-esteem, &c. All men are different, and must be so, and while each makes himself the standard, men must quarrel. When they are satisfied that their Creator intended they should differ, and that their opinions, even of his word, should be modified by their peculiar powers, they will see the necessity and propriety of mutual forbearance.

Mr. F. alluded to the charge of a tendency to materialism which has been brought against phrenology, and he

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satisfactorily refuted it by showing that phrenologists believe in no closer connection between mind and matter than anti-phrenologists do, and they require for the exercise of the intellectual powers a much smaller portion of the brain than is allotted to them by the anti-phrenologists, who claim the whole brain, and the heart also.

Mr. F. also met the charge of fatalism. He denied that the doctrine of various organs by which the mind acted, restricted its freedom of action, any more than did the common notion that every faculty of the mind acted by the whole brain. In the latter case, the evil propensity lay concealed until it burst into action; in the other case, that of phrenology, the power of the propensity could be accurately measured, and watched, and perhaps restrained, and prevented from doing mischief. Where then, asked Mr. F., is the danger from phrenology?

Mr. F. next took up the subject of mental and moral philosophy. He showed that philosophers had never agreed upon any system of ethics or metaphysics, and were no nearer to it now than in the days of Aristotle. He said phrenology offered a simple and beautiful system, which explained all the difficulties of the prevalent systems. He explained this position by numerous examples, but we can only say in general terms, that he considered *Attention*, *Memory*, and some other of the old fundamental powers as phenomena of the organs, and not as fundamental faculties. He explained *Judgment*, *Taste*, *Imagination*, &c. &c. He considered that every organ had its *Affection*, *Desire*, and *Passion*. *Pleasure* and *Pain* were but satisfied or unsatisfied *Desires*. *Will* was not desire, but the action of the reflective powers upon the promptings of the other organs.

He treated more largely of *Memory*, because of its connection with instruction. He showed its varieties, and how it used what is called *Association*. Every faculty has its memory, and each person has the best memory for things relating to those faculties which are predominant and most active in his mind.

Mr. F. finally described the various systems of *Mnemonics*, or artificial memory, showed in what principles they differed, exhibited a system of his own, which exer-

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cised the organs of locality, form, number, and comparison; and concluded his course by applying this system to impress upon the minds of his audience the names and numbers of the thirty-six phrenological organs he had described.

This second course, which was a repetition of the first, was very numerously attended, and the respectful attention with which the audience listened to the lectures of at least an hour and a half each, must have satisfied the lecturer that if he had not converted all his hearers, he had powerfully interested them.

After Mr. Fowle had completed his course, he delivered an essay on the character of the celebrated Whitefield compared with the developement of his skull. Some doubts having been expressed in one of the daily prints, as to the genuineness of the cast which Mr. F. used, the Secretary of the Boston Phrenological Society published the following Report, which, as a record of facts, we think sufficiently interesting to be appended to the above abstract of Mr. F.'s lectures.

FRIDAY, AUG. 2, 1833.

To WM. B. FOWLE, ESQ.—Having been requested, by the committee of which you are a member, to procure a cast of the skull of Whitefield, I thought it would not be amiss in me to give a description of the state in which the bones and dust of this distinguished philanthropist and preacher were found. It may, perhaps, give authenticity to the cast.

In the fulfilment of your request, it was my first object to ascertain the authenticity of the bones and other remains, said to have once been his. This I very soon did, and had every doubt removed from my mind, if any had previously existed there. Such a belief have the inhabitants of Newburyport of the identity of the bones deposited in their church with those of Whitefield, that a doubt or mistrust would seem to them a heresy.

A few years ago, the church in Federal Street, Newburyport, under the pulpit of which the Rev. George Whitefield requested to have his remains deposited, in case he should die in that town, was repaired and altered, and the

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relics were removed until a new tomb should be built directly under the present pulpit. This tomb has since been finished, and the remains of Whitefield, Parsons, and Prince are now deposited therein, in wooden coffins, stained red. The lid of each opens sufficiently to allow the upper third part of the relics to be examined. On the inside of each lid are painted, in black letters, the name, age and day of death of each person. On that of Whitefield are the following words:

Rev. George Whitefield died Sept. 30th, 1770, aged 56 years.

The tomb is very easy of access. Its entrance is from the porch or entry back of the pulpit, through a trap-door about two feet square. The level of the bottom of the tomb is about three feet below that of the entry floor. On lifting up the trap-door, and descending three feet, a door presents itself having about the same dimensions as the scuttle just mentioned. This door is vertical, and kept locked. On opening the door of the tomb, the three coffins are seen lying together. That of Whitefield is placed in the centre. At the right hand of Whitefield lie the remains of the Rev. Jonathan Parsons, the first pastor of the church, procured for that office by the instrumentality of Whitefield. At the left of Whitefield lie those of the Rev. Joseph Prince, in rather a worse state than either of the others, which are, indeed, in a very good state of preservation. This last lost the use of his eyes at the age of fourteen; the sockets of his skull are much smaller than usual.

The skull of Whitefield was lying at the head of the coffin in a manner which indicated at once that it had been removed; it was covered with mould and the damp decomposed integuments. Before venturing to take a mould from it, I carefully compared the condyles of the occipital bone with the superior articular apophyses of the atlas, or first vertebra of the neck. The inferior articulating surfaces of the atlas were compared with the superior ones of the axis, or next vertebra. The surfaces were found to agree perfectly. These vertebræ were found in their natural position, agglutinated by the mass of decom-

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posed matter. My reason for doing this was, that the skull had been detached from the other bones. To my inexperienced eye, too, there seemed to be a deficiency of the developement of reverence, together with a very large occipital region, and the condyles of the lower jaw were separated too far to form a correct articulation with the glenoid cavities of the temporal bones. This last was probably caused by the jaw being warped. In other respects, the upper and lower jaw coincided, as may be seen from the cast. The skull had been robbed of every tooth, probably by visitors, for relics, and was of the same dark color, till cleansed, as the other bones. The vertebræ show no appearance of having been moved from their situation, but gave satisfactory evidence that they had not been previously disturbed. The bones in general were in an excellent state of preservation, considering they had been buried sixty-three years.

On the front of the pulpit is placed a white marble slab, with the following inscription, in gilded letters:

Under this pulpit are deposited the remains of
The Rev. Geo. Whitefield,
and
The Reverend Jonathan Parsons, the first Pastor
of this Church, who died July 19th, 1776. Also of
The Rev. Joseph Prince, who died 1791.

In the north-east corner of this church, in Federal Street, is placed a very chaste and beautiful monument of white and variegated marble, the present of William Bartlett, Esq., said to have cost $1400. On it is inscribed, in golden letters, the following inscription:

This Cenotaph
is erected with affectionate veneration,
to the memory of
The Rev. George Whitefield,
born at Gloucester, Eng., Dec. 16, 1714;
educated at Oxford University, ordained 1736.
In a ministry of 34 years,
he crossed the Atlantic 13 times,
and preached more than 18,000 sermons.

As a soldier of the cross, humble, devout, ardent, he put on the whole armour of God, preferring the honor of Christ to his own interest, repose, reputation or

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life. As a Christian orator, his deep piety, disinterested zeal, and vivid imagination gave unexampled energy to his look, action and utterance. Bold, fervent, pungent and popular in his eloquence, no other uninspired man ever preached to so large assemblies, or enforced the simple truths of the Gospel by motives so persuasive and awful, and with an influence so powerful on the hearts of his hearers.

He died of asthma, Sept. 30, 1770;
suddenly exchanging his life of unparalleled
labors for his eternal rest.

NATH'L B. SHURTLEFF.

True copy. Attest, NAHUM CAPEN,
Secretary of the Boston Phrenological Society.

THE following letter, recently received from Batavia, directed to Mr. Holbrook, the former editor, is so interesting, that we feel greatly obliged to the gentleman who gave us permission to publish it.

BATAVIA, (JAVA,) JAN. 9, 1834.

DEAR SIR:—You wished for an account of the state of education, &c. in this island, as soon as convenient after our arrival. Your kindness in furnishing us gratuitously with a set of school apparatus, complete files of the Family Lyceum up to the time of our embarkation, a quantity of minerals, &c. &c., adds to the desire of communicating useful information, another motive for complying immediately with your request. Of course, amidst all the hurry and bustle we have constantly been in, I have but a few words now to say, but hope hereafter to be able to communicate something more to the point.

The number of inhabitants on Java are nearly as follows:

Europeans,	6,000
Chinese,	40,000
Malays,	300,000
Javanese,	5,654,000
Total,	6,000,000

The proportion of children is about the same as in the United States. As the inhabitants are divided into classes

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so distinct in point of character, I shall consider them separately.

The Europeans are mostly Dutch and their descendants. There are also a few English and French. The schools, except that of the London Missionary Society, under Mr. Medhurst's care, are Dutch, supported by government. I will defer a particular notice of these till a future time. Having had the promise from one of the School Directors of a minute account, but not yet having received it, I will merely state that morals and religion form no part of the branches taught. The Bible is not permitted to be read. The masters are, many of them, profane, vicious men, who care only for their rupees and the pleasure of spending them. Those parents who have any regard for the *morals* of their children do not send them to these schools; they prefer instructing them at home or sending them to Europe. A few days since I met with a lady who was weeping at the recent departure of her daughter for Holland, for 'there was not a school in Batavia,' she said, 'where she could trust her (Mr. Medhurst's being full) with any kind of hope that her *morals*,' to say nothing about religion! 'would not become contaminated.' 'O tempora! O mores!' who would not exclaim?

In China,* particularly in Canton and Hokien, great attention is paid to education, not only in schools, but parents teach their children at home. They are incited to this because education, as in the United States, is the path-way to civil office. Most of the Chinese on this island are from these provinces, and although they are mostly pedlars and mechanics, they have retained some of the spirit of the 'Celestial Empire.' Nearly or quite one half of them are unable to read and write. Their schools are abundant, attended mostly by boys, although many girls are sent, dressed in boys' clothes, till eleven years of age. The teachers are supported by their scholars, as in the private schools with you, each one paying about $10 per annum, more or less, as the case may be. These

* For an account of Education in China, see the Chinese Repository, at the Missionary Rooms, somewhere between July and October.

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teachers are well instructed after the Chinese mode of doing things, being able to *repeat* their own books from memory, write, make verses, &c.

No arithmetic is taught, and yet every Chinaman is a first-rate accountant. They will add, subtract, multiply and divide, and find the difference in exchange more rapidly than Europeans can on paper. The acquisitions of the scholars consist in learning the books by heart so as to be able to repeat them from beginning to end, without missing a word. After a boy has learned the characters of a book, the master condescends to explain to him its meaning. The boys are not divided into classes; each one learns as fast as he pleases. After one has heard the master read the lesson twice, he goes to his seat, and cons it over aloud, at the highest pitch of his voice, till he is able to repeat it; having the liberty, if he forgets any character, to inquire it out. As you may well suppose, the noise of so many reading different lessons is not small. As the roar of a waterfall leads you from a long way to the spot, so you are aware of your approach to a Chinese school long before you reach it. Besides this parrot-like exercise, the master gives out to each scholar two Chinese characters per day, which he explains to him, and also requires of each to repeat to him, before leaving school, the year, the month, and the day of the month.

In and about Batavia, the proportion of Malay schools and scholars is about equal to that of England. About one quarter or one third of the population are able to read. A majority of the scholars are boys, although there are many girls. I ought rather to call these Mohammedan schools, because all that is done is to teach the children the Arabic character, (in which the Malay is written,) and the Koran is not explained at all to them.

These schools are taught by priests or pilgrims, (pilgrims are those who have been to Mecca,) who receive no stipulated salary. The Malays consider teaching youth a meritorious action, and for the sake of performing a meritorious action these men are willing to teach. There are, however, one or two *minor* considerations, which make this willingness more perfect: e. g. every master raises

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goats for market, and he requires the boys to gather leaves and grass for them; also to cut his wood, draw his water, and cook his dinner. Besides which, every boy is expected, when he has *finished his education*, to make presents to the master; so that, taking into consideration '*the meritorious action*,' they seem, first and last, to be well paid.

You perceive that education is almost a nominal thing among the Malays and Chinese, and in an imperfect state among the Dutch. Although the schools are so abundant, they are much like the Pharisees of our Saviour's time—neither admitting their pupils to the light of science, nor permitting others to admit them. True, it is not a small thing that these people are enabled even to read; but yet their minds are left in a contracted, uninformed, bigoted state. Many of them are not able to read at all.

The great obstacles to the education of children are, a want of paper manufactories, printing-presses, book-makers, and good teachers. A great facility is a willingness of the children to attend school.

The Parapattau school—Mr. Medhurst's—contains about forty children, but as Mr. Keasbury, who has been a teacher in that school, will visit Boston before May, probably—having already embarked—I refer you to him; he has letters to the Missionary Rooms and Maynard and Noyes. Sure I am the school labors under a want of *the best* books. We should like, above all things, to present Mr. Medhurst with a complete set of apparatus, if it could be sent out. We have already given him some of the duplicates you gave us, as also one of the sets of the Lyceum. I am sorry to send you so meager an account, but perhaps another opportunity would not soon occur, and I thought it best to communicate what I could.

Ought not the Lyceum to be sent regularly (perhaps it is already) to every Missionary under the care of the American churches, of whatever denomination?

That the Lord would crown with abundant success all your efforts for the improvement of the rising generation, is the prayer of

Truly yours, in the great work of benefitting the world,

H. Lyman.

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ANIMAL MECHANISM.

Intending, in the course of time, to devote considerable attention to the subject of physical education, a methodical description of the frame-work of Man will necessarily be undertaken.

The accompanying plate is a back view of the human skeleton, with the names of the individual bones, indicated by letters.

THE HEAD.

a, The parietal bone.
b, The occipital bone.
c, The temporal bone.
d, The cheek bone.
e, The lower jaw bone.

NECK AND TRUNK.

a, The bones of the neck.
b, The bones of the back.
c, The bones of the loins.
d, The hip bone.
e, The sacrum.

UPPER EXTREMITY.

a, The collar bone.
b, The blade bone.
c, The upper bone of the arm.
d, The radius.
e, The ulna.
f, The bones of the wrist.
g, The bones of the hand.
h, The first row of finger bones.
i, The second row of finger bones.
k, The third row of finger bones.
l, The bones of the thumb.

LOWER EXTREMITY.

a, The thigh bone.
b, The large bone of the leg.
c, The small bone of the leg.
d, The heel bone.
e, The bones of the instep.
f, The bones of the toes.

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COLONIZATION SOCIETY OF MASSACHUSETTS.

HAVING been repeatedly asked the question, 'What is this Society doing?' we deem it proper to answer the interrogatory by presenting a general scheme of its transactions, and leave it to the good sense of the community to say whether the intelligent members of this Association are philanthropists or not.

SINCE the organization of the Massachusetts Colonization Society, which is comparatively of recent origin, its transactions have not been distinguished by any very bold or active measures. Situated as its members are, at the northern extremity of the United States, where the evils of Slavery are not exhibited, and where the influence of this foul blot on the escutcheon of this land of boasted freedom are only remotely felt, it would have been the height of indiscretion, at least, to have joined in violent declarations against a system of oppression, of which they knew nothing by practical experience; and any attempt to enlist the sympathies of the people towards the real or supposed sufferings of a degraded portion of our race, held in bondage by our Southern Brethren, without carefully weighing the consequences reasonably to be expected, both to the master and the slave, would have been no less indiscreet, than subversive of the first principles of good order.

An investigation of the plans which have been proposed by the Parent Institution at Washington, or by philanthropic individuals, whose exertions in behalf of the moral condition of the Ethiopian, have been from time to time proposed to the people, has constituted the principal business of this Society.

The Society has, at no period since its formation, manifested a very ardent disposition to exert its influence, in transporting free people of color to the colony in Liberia. Though it has invariably been disposed to look favorably on the projects of the Parent Institution for shipping from the Southern States those who particularly desired to be planted on the soil of Africa—the home of their ancestors,—they have contemplated with deep

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solicitude, the waste of human life in their early operations, resulting from a change of climate, which no constitution could withstand, without undergoing a series of bodily sufferings. But, notwithstanding those early discouragements, through the persevering industry of the Society's agents, the colony has become a flourishing one; and this Society anticipates with delight the mighty changes which a little band of freemen may be enabled to effect, directly or indirectly, on the benighted regions of that country to which they have gone. Already we see the merchant penetrating rivers that were never before explored by civilized man. Tribes have been discovered that were never before known, and kingdoms will unquestionably be brought to light, by the sure and steady advances of the Liberian colonists, that were never yet registered in the catalogue of nations. This association feels, too, that while the spirit of adventure, or a love of traffic is thus continually developing the concealed resources and internal condition of a great continent, that from remote antiquity, has been beset with barriers which no traveller has passed, the pure doctrines of the christian religion may be widely and beneficially disseminated. Without this guiding star, all effort would be vain, and all attempts to ameliorate or soften the characters of barbarian infidels would be abortive and hopeless.

The Massachusetts Society, in reality, has been viewing the present condition, and looking forward to the future prospects and probable destiny of the people of Liberia. It desires to show that it is not an inattentive spectator of the interesting scene, which a moral, religious, well-regulated government presents, where slavery, bloodshed, and the lowest species of idolatry, have characterised the land from immemorial time.

With reference to the well-being of future generations, it has been thought by this Society that it was indispensably necessary, to the perpetuity of the colony, that permanent provision should be made, for sustaining a FREE SCHOOL, of an elevated character, in which the youth might be taught those fundamental branches of knowledge

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which are absolutely requisite for conducting the common affairs of life.

A sum of money, the last season, was appropriated from the limited funds at the Society's disposal, for the maintenance of two public instructors in Africa; but owing to the sudden death of one of them, soon after his arrival, the contemplated course of instruction, which had been designated by a committee of the Society, was never commenced, nor were the funds ever transmitted which were assigned for their compensation.

At a recent meeting of the board of managers, it was proposed to erect, at the expense of the Society, a spacious and convenient stone edifice in Monrovia, to be denominated, the '*Massachusetts Free School*,' which shall forever remain a monument in the eyes of the parent, of the solicitude which this particular branch of the National Society has felt for the moral elevation of his children. To accomplish the proposed undertaking will require far greater means than are at the control of the treasurer, yet the Society entertain no fears for the result of an appeal to the liberality of the citizens of New England, which promises so much for the present happiness and future character of any portion of regenerated Africa.

Indeed, it may with truth be said that this one subject engrosses the undivided attention of the Society, at the present moment, nor would the members relinquish a scheme which promises such a decidedly important influence, as a well-regulated, well-endowed ENGLISH HIGH SCHOOL, without the most positively determined opposition, or unwillingness on the part of those, who have thus far been almoners, under Providence, in the blessed cause of christianity and civilization. To this end, unless some unforeseen circumstance interrupt the intended operations of this Society, will its whole force, for the present, be directed. It is not covetous of the honor arising from a design so noble and exalted, as that of laying an abiding foundation for civil liberty, piety and moral excellence, where only treachery, human butchery, and untold pollutions have awakened a spirit of inquiry in the world, that we trust will never be allayed, till the rights of

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man and the hopes of the christian are felt through the mighty moral wilderness of neglected Africa.

While they feel that their power is but a feeble effort, even in some respects acting counter to the opinions of those whom they respect as friends and brethren, the prize is too vast to be relinquished, till charity hath nothing to give, till philanthropy slumbers, till good men are no longer willing to promote virtue, genuine piety and vital religion.

Education, freely disseminated, promises the greatest amount of permanent benefit to the colony, which may now be considered as presenting the successful results of an interesting experiment on human nature, in its rudest and most unpromising form. It must be sustained; it must not be suffered to wane in the very beginning of its usefulness. We appeal to the well-wishers of African Colonization, and ask them if it would not be reproachful to the age in which we live, and to the country that gave us birth, to withhold that fostering care which is reasonably expected from men who profess to love, and to pray for the success of the cause in which the Society is enlisted.

Trusting to the guidance of that Providence, which never forsakes the oppressed, they will continue to act under a feeling of responsibility towards the distant colonist, which will lighten the labor from a sense of duty; and do all their circumstances will allow, to lay a sure corner stone, whereon to build that intellectual edifice, which can alone sustain or fulfil the intentions of New England Colonizationists.

Port Jervis, (Orange Co. N. Y.,) May, 4, 1834.

To the Editor of the Tracts and Lyceum.

I am but an occasional reader of the Tracts and Lyceum, but observing a communication in the number for January 15th, signed H, respecting certain small 'cylinders' composed of stone, and which the writer conceives

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had been inhabited by some insect, I take the liberty to offer some facts connected with the same subject.

About the last of March, as I was returning from a ramble among the rocks and hills which almost surround our little village, and from the summit of which the lovers of nature have an *elevated* view of the River Delaware, as it winds its course along the valley, embracing in the same glance a part of the Delaware and Hudson Canal, as it leaves the course of the Delaware, and passes up in a north-easterly direction towards the Hudson, I was attracted to a small spring, (being thirsty) which issues from the side of the mountain, at an elevation of about 400 feet above the village. On stooping to drink, I was surprised, like your correspondent 'H,' to see a great number of small cylinders of the same description that your writer gives. I took several in my hand, and concluded that they must have been inhabited. One end of the tube or cylinder was closed, and the other appeared black, as if filled with dirt; but on pressing this cylinder between my fingers, I was surprised to see a living animal issue from his hiding place, apparently not well pleased with so rough usage.

My curiosity now being awakened, having never before seen or read of such an animal, I carefully opened one of the tubes, and obtained a perfect insect, having six legs near its head, to direct its motion. The head of this ininsect and as far back as its legs, is of a dark brown color, while the the remainder of its body is nearly white.

Having agitated the water in the spring, which changed their position, these insects would protrude themselves from their cell about half an inch, and travel about upon the bottom with apparent ease, while the cylinder, tube, or shell, or whatever else you may please to call it, remained attached to them. And whenever I would take the most active between my fingers, they would contract themselves within their cell; and on moving my hand with several of them together, they would rattle like small gravel stones.

A friend who was with me took about half a dozen, and enclosed them in a small box. They were very restless,

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and used every exertion to escape. They lived two days in this box, without having any water put on them.

I have just visited the spring again, and have procured some with the insect in them, and others where both ends of the cylinders are closed.

Whether the insect has deposited its eggs in its cell, and then left it, closing the aperture, I know not; but this is certain, that these cylinders are not so numerous now as in March. Several remain on the bottom unoccupied, and appear in a decaying state, while the bottom of the spring is alive with insects, but little resembling the one described, and which were not to be seen in the spring before.

Lest my description should not be sufficient to give you a correct knowledge of this insect, which, I believe, is not noticed by writers, I have enclosed a few of them in this communication, and could if desired, forward some in a jar of water to any friend you may have in New York, so that you could see them, as I have, alive and active.

I remain yours truly,

JOHN CONKLING.

The specimen of which our correspondent makes mention, came safely to hand, but it was not thought advisable to procure a drawing, for the present.

CAUSE OF FEVERS.

HUDSON, the discoverer and first navigator of Hudson's river, on the 6th of September, sent a boat to sound the Kills, between Bergen and Staten Island, and his men, on their return, reported that the 'lands were as pleasant with grass and flowers, and goodly trees, as ever they had seen, and very sweet smells came from them.' This is not now the case. The grazing of cattle, the rooting of swine, the plough and other implements of agriculture, have entirely destroyed a great number of the annual

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grasses and plants which formerly flourished in this country. Several persons told Kalm, so far back as 1748, that the loss of many odoriferous plants, with which the woods were filled before the arrival of the Europeans, but which the cattle have now extirpated, might be looked upon as a cause of the greater progress of the fever; for the great number of those strong plants occasioned a pleasant scent to rise in the woods, every morning and evening. The vegetable kingdom of our western country is uncommonly rich, and luxuriantly abundant, because cultivation has been but partially extended to it. Hogs have produced great destruction among all tuberous and bulbous roots. Even the laurel tree of Carolina has become almost extinct in many parts of the country, owing to the depredations of domesticated animals.

SUBJECTS OF INQUIRY.

THE following, among others, are still subjects of speculation and controversy:—What is national wealth? The means of producing it? the influence or action of the generating causes? their immediate or distant effects? their apparent or actual results? the different ramifications of the sources of wealth, such as labor, capital, the circulation of commodities or commerce? and the revenue or consumption? the source of wealth, whether in labor, foreign commerce, land or capital stock? in what capital consists? the nature of money? the proportion which the circulating money of a country bears to the whole value of the annual produce circulated by it? Whether labor is the standard of value, and whether there is an immutable standard measure of value? whether agricultural labor is exclusively productive or most productive? and perhaps, the most controverted subject of political economy is, whether the home or foreign commerce is most productive of national wealth?

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CHINESE ECONOMY IN FISHING.

In some former article an allusion has been made to the Chinese mode of fishing with the cormorant, (*Pelicanus piscator,*) a bird which has become as important to

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that ingenious people, in domestic economy, as some of the larger animals in common use in civilized countries. The annexed drawing simply shows the precise mode of conducting the operation. There are no restrictions on the fisheries in China; the subject, in fact, is not even remotely hinted at in the *Leu-lee*, or statute laws. Salt fish are an extreme rarity in the empire, and few, perhaps, of the common people ever tasted the article, on account of the excessively high duty on salt.

Sir George Staunton, when the embassy was proceeding on the great southern branch of the Canal in China, saw the Chinese fishing on a large scale, on a lake, with the cormorant. There were thousands of small boats and rafts, built expressly for this species of fishing. On board of each were ten or a dozen of those birds, which, at a given signal from the owner, plunged into the water; and it much astonished Sir George to see the enormous size of the fish with which they returned in their bill. At that place, they were so well trained that it did not appear necesary to place a ring on the neck, to keep them from swallowing the prey. The master occasionally gave them a portion, by way of encouragement.

The natives of Cuba formerly carried on a very singular sort of angling with the *remora*, or sucking-fish, in the following manner. A strong, small twine was made fast round the tail of the fish, which, by the way, was kept in a vat, and carried in a vessel of water, wherever its services were required, and then thrown overboard. It ran instinctively towards the first fish which the length of line would permit it to reach, and instantly made itself fast. The moment the fisherman felt that such was the case, he gently drew in the line, drawing both near the surface. He then carefully run his hands under water, and thrust a finger under the edge of the disk, which at once broke the connexion. When he had secured the game, he then permitted the remora to run again, and in that simple, though ingenious manner, it was the most successful mode of fishing of which there is any account, unless it be with the cormorant.

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MIXED BLOOD OF AMERICANS.

'It is acknowledged,' says Cicero, 'that literature, polite arts, religion, agriculture, laws, and social rights originated in Athens, and were thence distributed over all nations.' The fertility of the soil, the excellence of the climate, the freedom of the government, and the enterprising spirit of the people, must have co-operated in producing this transcendent and pre-eminent state of human exaltation. And if a comparison was instituted in those respects between that country and ours, in what important part should we be deficient.

We are, perhaps, more favored in another point of view. Attica was peopled from Egypt, but we can boast of our descent from a superior stock. I speak not of families or dynasties; I refer to our origin from those nations where civilization, knowledge, and refinement have erected their empire, and where human nature has attained its greatest perfection. Annihilate Holland, Great Britain, Ireland, France and Germany, and what would become of civilized man? This country, young as it is, would be the great Atlas remaining to support the dignity of the world: and perhaps our mingled descent from various nations may have a benign influence upon genius. We perceive the improving effects of an analogous state upon vegetables and inferior animals. The extraordinary characters which the United States have produced may be, in some measure, ascribed to the mixed blood of so many nations flowing in our veins; and it may be confidently predicted, that the operation of causes, acting with irresistible effect, will carry, in this country, all the improveable faculties of human nature to the highest state of perfection.

THE ROYAL SOCIETY OF ENGLAND.

The Royal Society of London, for the improving of natural knowledge, (the first institution of this kind,) was

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established about the year 1663. Butler, the author of Hudibras, wrote a satire against it, entitled, 'The Elephant in the Moon.' Sprat, the historian of the society, feeling too acutely the shafts of ridicule, attempted, in a singular way, to propitiate the hostile wits. 'To gain their good will,' said he, 'I must acquaint them that the family of Railleurs is said to be derived from the same original with the philosophers. The founder of philosophy is confessed by all to be Socrates, and he also, was the famous author of all irony. They ought, therefore, to be tender in this matter, wherein the honor of their common parent is concerned.' Cowley, on the other hand, wrote a complimentary address to the society.

The satire of Butler has sunk into oblivion, while the society which it assailed has established a reputation and usefulness that cannot be subverted or denied. From its origin to the end of the eighteenth century, (as appears from Dr. Thompson's History of the Royal Society from its institution to the end of the eighteenth century,) it has published 4,166 memoirs on natural history, anatomy, surgery, medicine, mathematics, mechanical philosophy, chemistry, and miscellaneous subjects, the greatest number of which is on astronomy, medicine and chemistry. The institution of this society was soon followed by that of the Royal Academy of Sciences at Paris; and similar associations have been since formed in almost all the important cities of Europe.

ORIGINAL MISCELLANY.

ORFFYREUS'S WHEEL.—Gravesend, in his *Œuvres Philosophiques*, published some time about 1774, at Amsterdam, gives an account of a singular machine constructed by one Orffyreus, which was styled a perpetual motion. The facts in relation to it, as nearly as we can ascertain, were simply these. A large circular wheel, twelve feet in diameter, and fourteen inches thick, was

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made of very light, thin deal boards, resembling a drum, as mechanics call it, for carrying bands. The sides, or rather ends, were covered with waxed cloth, to prevent any one from discovering the inside. Through the centre was an iron axle, the gudgeons of which rested on two upright pillars, in the manner of hanging a grindstone. On giving it a slight motion either way, its revolutions speedily increased to twenty-five a minute. For two months it never varied in the least from that motion. Being placed in a chamber, at the residence of the landgrave of Hesse, the door was fastened, and the seal of his highness placed on the lock. At the expiration of sixty days the apartment was opened, and the wheel found revolving at the usual speed. It was then stopped, to prevent it from being worn out. The inventor was so incensed because Professor Gravesend undertook to examine it, that he broke it in pieces before his face. The landgrave once saw the inside, but being sworn to secresy, only said it was very simple. Both the inventor and his friend died soon after, and all knowledge of its construction is therefore lost to the world.

Blown Lenses.—There are many ingenious men in such narrow circumstances that they are compelled to construct their own instruments, in order to prosecute those researches for which they entertain a decided predilection. We are personally acquainted with several men who are devoted particularly to the study of optics, and to such, therefore, the following economical mode of making lenses for microscopes must be acceptable. Take a piece of flint glass, as a broken portion of a tumbler, for example, and heat it in the flame of a lamp, till it can be drawn into a thread. At the extremity there will be a globule, or technically, a *spherule*. Upon this, force the blaze by a blowpipe. The thread by which it is suspended will become smaller and smaller, and as the little ball descends by its gravity, it assumes a more perfect spheroidal shape. The size of these globules may be increased by allowing more of the thread to be incorporated, and so on. By a little practice, glasses may be easily constructed, which, rightly managed, are very perfect in the instrument in which they are set.

Mammoths.—The skeletons of three mammoths are said to have been found, recently, in a cavern in the island of Podrese, and carried to Cronstadt.

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TEMPLE OF BELUS.—In the centre of the temple of Belus, in the renowned city of Babylon, stood the magnificent tower of Babel, which was 600 feet square at the base. It was constructed to resemble eight massive towers, piled one above the other, each one being twenty-five feet high. On the outside was a winding staircase reaching to the top. Within the different stories were lofty and beautifully finished apartments, studded with columns, and rich in architectural design. These were chapels, in which public worship was offered to Baal. On the very summit of the eighth tower, was an observatory, where many important astronomical observations were probably made, which have been transmitted to our day. A golden image, forty feet high, was kept in one of the splendid halls, whose value was equal to three millions and a half sterling. The entire value of the gold, silver, jewels and other royal property kept in this sacred edifice, has been computed to have been equal to forty-two millions of pounds sterling. Each brick of the tower, as well as of the walls of the city, bore a character. Several of these are now in Boston, brought from the supposed site of the tower.

DEPTH OF THE OCEAN.—One mile and sixty-six feet is the lowest depth to which the ocean has been sounded. Where the coast is rugged and high, the water is deep. All the surface covered by seas is three times greater than the dry land, being 148 millions of miles. If the medium depth of the sea be reckoned at two miles, there must consequently be 296 millions of cubical miles of water. The quantity, therefore, is sufficient to cover all the known dry land on the globe to the height of *eight thousand feet*: and further, were all this mass of water thrown into the shape of a ball, it would be *eight hundred miles* in diameter. Philosophers of enlarged views generally believe, that the present beds of all oceans were, at a former period, the habitable parts of the earth. There is no other mode of explaining the presence of such immense masses of marine productions, quite in the interior of all the continents as are continually brought to light, than by supposing they were once covered by the sea.

ROMAN COINS.—A while since, a great number of Roman coins were found on Fairhead, a lofty headland near the Giant's Causeway.

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THE SUN.—Such is the astonishing magnitude of that vast globe, that were its central parts placed opposite the earth's centre, or, in familiar words, were they placed side by side, its circumference would reach two hundred thousand miles beyond the orbit of the moon. Its diameter is 880,000 miles, and it contains, therefore, matter enough to construct thirteen hundred thousand globes of the size of the earth. Travelling at the rate of thirty miles a day, it would require 18,000 years to visit every square mile of this world, and at the same rate of motion, it would take 2,000 millions of years to traverse every square mile of the sun's surface. At the rate of ninety miles a day, in eighty years, a man would only circumscribe it. Undoubtedly the sun is inhabited by rational beings, who, if it is possible for them to discover our speck of a planet, probably commiserate the condition of the beings in it. The extraordinary brilliancy of the sun's light seems to depend upon a luminous vapor or atmosphere, by which it is surrounded, as openings are made through it by unknown causes, through which the dark body of the sun is distinctly seen.

BACCHANALIA.—No person can reflect upon the strange manner in which the ancients celebrated the orgies of Bacchus, without being struck with evident reference which was made to the transgression of Eve. They were celebrated once in three years. The multitude ran like insane people, crying *evoe, evoe!* Young women, at Athens, carried little golden baskets of fruit, from which various species of serpents were continually disengaging themselves to terrify the spectators. To such extravagance and fury were the devotees excited, that they tore off the flesh of a bull, while alive :—*vivum laniant dentibus taurum.* At Tenedos, the votaries actually tore off the limbs of a man. In all their public as well as private ceremonies, a serpent was the invariable accompaniment.

GUNPOWDER.—Langles, in a memoir before the French National Institute, gives an opinion that gunpowder, (or in other words, the process of making it) was conveyed to Europe by the returning crusaders. It is certain that the Arabs made use of it in 690, at the siege of Mecca, and he therefore supposes they must have derived it from the Indians, among whom it was known from immemorial time.

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ROMAN BAKERS.—Sometime about 583, bakers were introduced from Greece to Rome, where they were so much esteemed, that they were occasionally admitted into the senate. They were forbidden to associate with gladiators or comedians, in order that they might be honorable in the estimation of the people. They were associated as a corporation, from which neither themselves nor their descendants were allowed to withdraw; and they were exempted from guardianships, to which the citizens were liable, in order that they might not be interrupted in their important business of preparing bread for the multitude. Each baker was under the supervision of a patron, and one of these generally managed the concerns of all the others, which constituted the college of Roman bakers.

BARBARITY OF ENGLISH LAW.—One hundred and sixty different crimes of which man may be guilty, in the British code of laws, are to be punished by death. In the reign of Henry VIII, there were *seventy-two thousand public and private executions*, which was at the rate of six executions a day, including Sundays, during the whole reign of that infamous wretch. We hope to live till that glorious period arrives, when the punishment of death shall be abolished by all civilized nations. When Cain, the first murderer, expressed a fear that he should be slain, and a mark was set upon him, that he might not be killed, he said unto the Lord, 'My punishment is greater than I can bear.' Life, under such circumstances, is a greater punishment than death.

SACRIFICE OF HUMAN LIFE.—During twenty-two years of the life of that diabolical foe to the human race, Jenghiz-Khan, it is computed by credible historians, that 14,470,000 persons lost their lives through his instrumentality. By his express command, one hundred thousand prisoners were beheaded in one day. His successor, Tamerlane, was considered of a more gentle disposition, having never *pounded over four thousand people to death*, in large wooden mortars, at any one time.

EVAPORATION.—The Mediterranean contains 762,000 square miles, from which there is daily evaporated 5280 millions of tons of water.

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Curious Trees and Plants.—In South America, Humboldt found a tree which produced milk, called the cow-tree, from which the surrounding inhabitants regularly obtained supplies of that delicious liquid. In other places are plants and trees which distil water. A traveller in the tropical forests of America, says he must have perished with thirst, had it not have been for the *Tillandsia*, or wild pine, a parasitical plant which clings upon trees, whose joined leaves collect at their bases large quantities of water. The *Nepenthes* of India not only furnishes water in its leaves, which have pitchers at their extremities, but also covers, to prevent the water from evaporating.

Antiquity of the Bagpipe.—Suetonius mentions this instrument, and it is, moreover, certain that Nero, who was passionately fond of music, performed on the bagpipe. On one of that monster's coins it was figured very accurately. Even St. Jerome alludes to it in a letter to Dardanus. As long ago as the fifteenth century, it was known in France. In Ireland, too, it was well known, from a very remote period. King Edward III, and queen Elizabeth kept *household bagpipers*. It was played at the battle of Bannockburn, in 1314; and in 1436, James I, of Scotland, who was murdered, was a tolerably expert performer.

Inquisition.—From 1481 to 1759, the horrible tribunal of the Inquisition burned alive 34,658 persons; and between 1481 and 1808, sentenced 288,214 to the gallies or perpetual imprisonment. In the auto of Toledo, Feb. 1501, 67 women were cast into the flames. In the Duchy of Lorain, 900 women were consigned to the fire, for being witches, by one inquisitor, who in the course of his official life, caused, by his accusations, the death of 30,000 women. Torquemada, the infernal inquisitor of Spain, in the short time of fourteen years, brought to the inquisition 80,000 persons 6000 of whom were burned with holy pomp and satisfaction.

Royal Society of Literature.—Mr. Cullimore has been writing most learnedly, to sustain the authenticity of the writings of Manetho. Much curious matter was brought together, copied from ancient inscriptions, which, were it compatible with the design of this journal, would be reprinted.

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ST. MARK.—Francis Douce, Esq., F. A. S., exhibited before the Society of Antiquaries, Jan. 23d, the foundation-stone of the cathedral of St. Mark, at Venice, erected about one thousand years ago, which was discovered when the present cathedral was built, on the site of a former one. It is a flat, circular piece of Vecchia marble, about six inches broad and half an inch thick, having on one side the head of St. Mark. Mr. Douce read at the same time, from Tacitus, the Roman ceremony of laying the foundation of a temple.

BANIAN TREE.—On the banks of the river Narbuddy, in the province of Guzzerat, is one of these remarkable trees, the same, probably, that was described by Nearchus. Though severe floods have carried away portions of it, there still remains as much as measures two thousand feet in circumference. The large trunks of this single specimen of gigantic growth are three hundred and fifty in number. The MONKEY-BREAD TREE is scarcely inferior. In St. Jago, one of these trees measured, at the base, fifty-six feet in circumference.

LIGHT.—Dr. Nieuwentyt has computed that, in a second, there flows 418,660,000,000,000,000,000,000,000,000,000,000,000,000,000 particles of light out of a burning candle, which number contains, at least, 6,337,242,000,000 times the number of grains of sand in the whole earth, supposing every cubic inch of the earth to contain a million of grains.

ATMOSPHERIC PRESSURE.—The hamlet of Antisana, which is 13,500 feet above the level of the ocean, is the most elevated inhabited place on the globe. Condamine and Bouguer, with their attendants, lived three weeks at an elevation of 14,604 French feet, where the barometer stood at 15 inches 9 lines, and consequently, the pressure on the body was 16,920 pounds.

ANCIENT ARCHITECTS.—These were chiefly Greeks, who kept their machines, or mechanical powers for raising great edifices, a profound secret, which is the reason why Vitruvius and other writers have made no mention of them. In Rome, the carpenters and masons were a corporation styled *Collegium Murariorum*.

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RIVERS.—An ingenious writer, after having mentioned the fact, that in the old continent, there are four hundred and thirty rivers falling into the ocean, and calculating the probable quantity of water which must be carried onward to the ocean, by all the rivers on the globe, says, that were all the known seas drained, it would require a period of twenty thousand years to refil them, by all the rivers now existing, running at their present rate.

SIX FINGERS.—Pliny mentions examples of six-fingered persons among the Romans, who were denominated *sedigita*. C. Horatius had two daughters, and both had five fingers and a thumb on each hand. In the United States, there is scarcely a family bearing the name of *Kendall*, in which there are not individuals, having five fingers on one or both hands, beside *six toes on each foot*.

DOGS.—Pallas was fully convinced that the Jackall is the progenitor of all races of dogs, which they closely resemble in manner and disposition, beside being, in some breeds, of the same size and figure. Guldenstædt discovered that the teeth and cæcum were perfectly alike in the dog and Jackall: the wolf and dog do not agree in these respects.

DIFFUSION OF KNOWLEDGE.—A royal Sardinian edict was promulgated, so lately as 1825, which forbade every person from learning to read or write, who could not prove the possession of property above the value of fifteen hundred livres. To become a student, the possession of an income of the same sum is necessary.

GASTRIC JUICE.—When putrid flesh is swallowed by animals, the gastric juice, or solvent fluid of the stomach immediately changes the fœtor. Dr. Beaumont says that any digestible substance undergoes the same changes in it out of the stomach, that it does in that organ, provided it be kept at the vital temperature.

HEAD OF VENUS.—Gall and Spurzheim expressly declared that the head of Venus, in those highly valued specimens of ancient sculpture, which have been preserved to our times, was too small for an intellectual being, and the goddess of love was therefore represented as an idiot.

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TO CORRESPONDENTS.

SPECIMEN OF A LETTER.—'Sir, the essay *what* accompanies this, was *wrote* in haste, but as it rests on the broad basis of past hopes and good wishes for future generations, I trust that it will be placed in print. Nothing, Sir, stimulates the youth, so much as first impressions. My own recollections to excell in education, will be the last things *what* decay.'—NOTE. We recommend leeches to be placed over the thickest parts of our erudite correspondent's skull, at the expense of the town. In order to give more force to this very profound nonsense, the grammatical beauties of the composition have been italicised on our own responsibility.

CAPT. O.'s theory is quite new: whether as correct as ingenious, remains to be proved.—The strictures on Capt. Couthuoy's paper upon the luminous appearance of the sea, are not to be compared to that gentleman's beautifully written paper, and therefore, is not only wholly inadmissible, but so far inferior, as not to be spoken of on the same day of the week.

MR. GILCHRIST may, perhaps, have extracted copper from the ore, of which he has forwarded a specimen; but a gentleman learned in such affairs, positively asserts that he should as soon think of running a mail coach to the moon, as extract pure copper from the SULPHATE OF IRON.

ON THE PROPERTIES OF AIR, by Mr. Fish:—gladly accepted.

B. F.'s communications are always to the point.

———, from Exeter, N. H., should have been post-paid, without which, we cannot see any manuscript in the right light.

———, from Pittsburg, pertinent and lively.

———, from Pittsfield, Mass. The author probably wrote each paragraph on a lucky day.

———, from Pawtucket, R. I., has altogether mistaken his own design.

———, from Georgetown, D. C., smacks of the shop. Mr. P. keeps oysters to sell, or else sups on his favorites daily.

B. F. BARNUM, who for the first time gives us notice of his existence, in ten pages of German text, writes understandingly on fossil remains.

MR. PROUTY will fathom the whole matter by half an hour's industry over the pages of Priestly, Vol. 3, last edition.

ALEX. BELMONT, of T., might as well have sent his love as his SPECULATIONS.

S. M. cannot very conveniently demolish Mount Holyoke.

J. L. Q. had better turn his attention to plain matters of fact:—we have no doubt that he would hoop a tub as well as any cooper in the community.

R. R. might, perhaps, alarm the neighbors, but his groans would never deceive a physician.

———, from Troy, N. Y., quite at home. The system of education to which the writer alludes, must be approved of everywhere.

DR. DAVIS'S ingenious and scientific paper on the early discoveries in America will appear in the next number, which is the commencement of the fifth volume of this publication, and volume second of the new series.

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